Health Status Surveillance of School Children

Project Report

Public Interest Incorporated Foundation Japan Society of School Health

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Introduction

The urbanization, IT development, decreasing birthrate and ageing society as well as changes in social environment and lifestyles associated with globalization are manifested in various adverse effects in children, such as in decreased physical activity levels and play time among children, dietary changes, reduced sleep, increased physical stress, and diluted interpersonal relationships; these changes are seriously interfering with the sound growth of children both physically and mentally. The trend of obesity and the increase in the number of children with lifestyle-related risk factors also indicate these adverse effects. In light of this, various stakeholders are raising a voice of concern, demanding that the effort to prevent lifestyle-related disease should start from early childhood. Addressing atopic dermatitis and various allergy symptoms including food allergies are also pushed as important health issues.

Under the cooperation of the Ministry of Education, Culture, Sports, Science and Technology, the Public Interest Incorporated Foundation Japanese Society of School Health has been conducting a survey project since FY1992 to study the relationship between the daily patterns and lifestyles of children and the status of their physical and mental health and publishing the results as the project reports to help school health education and raise awareness.

This survey is done every two years with the cooperation of schools selected nationwide to participate in the survey. In the FY2014 Report, survey targets were increased and the results were further analyzed and examined by the Surveillance of School Health in School Children and Adolescents Committee; as a result, the report includes a wide range of discussion from the risk factors for lifestyle-related disease and lifestyles in relation to mental health and sleep to allergy symptoms.

This report has been highly appreciated by researchers and other people involved in school health as a valued resource for guidance and awareness-raising.

It is our hope that these objective, scientific, and fundamental information will help those who are involved in health management, education and guidance for school children in Japan.

We are in the process of preparing a guidebook for developing desirable lifestyles in children based on this report, which will be made available not only for the government officials but also for schools staffs and parents.

We are also investigating a possibility of making this report internationally available as a part of our project promotion.

Finally, I sincerely thank the schools that cooperated in this survey as well as the committee members and other people involved in preparing this report.

March 2016

Public Interest Incorporated Foundation Japan Society of School Health
President,
Yoshitake YOKOKURA, M.D., Ph.D.

Chapter 1. Overview of the *Health Status Surveillance of School Children* Project

1. Purpose

This project has been carried out for the purpose of contributing to health education, management and administration by surveying and analyzing the current health status of Japanese school children mainly in the fields of lifestyle-related diseases and its risk factors, mental health and allergy.

Children are undergoing major changes in their lives and suffer from diseases as social environments and lifestyles have rapidly transformed in recent years. The awareness of their current status, and clear understanding of their current lifestyles, prevalence of diseases, and risk factors involved, can help clarify the cause of diseases and will serve as a valuable foundation for solid school education, administration and research. Some important data that suggest certain annual changes have been presented through this ongoing project.

2 Contents

In the Project “Health Status Surveillance of School Children,” the committee consisting of experts from different areas primarily conducts a questionnaire survey with the cooperation of the prefectural and municipal Boards of Education, and the committee tabulates and performs statistical analysis.

The findings on the health status of school children are contributed back to the prefectural/municipal governments in the expectation that the information will be utilized effectively.

The characteristics of a given survey, presence of any characteristic changes among different regions, and annual changes are also included in the analysis. Integration of this information allows for more defined analysis and can greatly contribute to the understanding of current status and future responses.

Chapter 2. Overview of the *FY2014 Surveillance of Health in School Children and Adolescents*

1. Purpose

This project has been carried out for the purpose of contributing to health education, management and administration by surveying and analyzing the current health status of Japanese school children mainly in the fields of lifestyle-related diseases and their risk factors, mental health and allergies. By studying various parameters including daily customs, eating and exercise habits, mental health, allergies, physical measurements, and laboratory test results, the project aims to clarify the current status and background of health education, and provide evidence for making policy and developing future approaches.

2. Contents

The basic principle of the survey is to present the same questions from FY2014 with the aim of understanding not only the current status, but to also provide evaluation over time. The investigation consists of “risk factors for lifestyle-related disease,” “lifestyle (exercise, diet, and others),” “mental health,” and “allergy symptoms.” Of these, survey items are entirely reconsidered in the areas of mental health and allergy symptoms. Other survey items were partially modified or used the same questions that the previous survey used. Survey staff in charge of different areas mainly tabulated and analyzed the data. The discussion for each area was thoroughly examined by the committee members who have been involved in school education, statistical analysis, or previous surveys; the final check was performed by the committee chair.

3. Subjects

In total, 123 elementary, junior high, and senior high schools from 21 prefectures were surveyed. The total number of school children surveyed was 19,219, as shown in the table below.

		School Age					Overall
		Elementary School *Grades 1-2*	Elementary School *Grades 3-4*	Elementary School *Grades 5-6*	Junior high school *Grades 7-9*	Senior high school *Grades 10-12*	
Gender	Boys	1,121	1,377	1,319	3,844	1,998	9,659
	Girls	1,080	1,330	1,282	3,647	2,221	9,560
Total		2,201	2,707	2,601	7,491	4,219	19,219

4. Period of the survey

December 2014 to February 2015

5. Methods

(1) Public Interest Incorporated Foundation Japan Society of School Health (JSSH) distributes the questionnaire sheets and supplementary materials to the prefectural Boards of Education that manage the collaborating schools through the prefectural offices of JSSH. (Some schools received the survey materials directly from JSSH.)
(2) Prefectural Boards of Education then distribute the questionnaire sheets to collaborating schools (via local Boards of Education for elementary and junior high schools).
(3) Class room teachers or nursing teachers (YOGO teachers) enter the designated prefecture code and school code on the last pages of all questionnaires as specified in the appendix.
(4) Class room teachers or nursing teachers (YOGO teachers) distribute the questionnaires to the school children who are subject to the survey, and instruct them to enter their names at the last page under the “name” section.

(5) (A) For “lifestyle” questions, elementary school children bring the question sheets home and their parents fill out the answers; junior high and high school children fill out the answers themselves at school.
(B) For “allergy symptoms” questions, all school children bring the question sheets home and their parents fill out the answers.
(C) The general rule is to answer questions based on the school day conditions during schooldays.

(6) Class room teachers or nursing teachers (YOGO teachers) collect the questionnaires from children, and fill out “risk factors for lifestyle-related disease” items, including the body height, weight, blood pressures, and waist circumference of each child.

(7) Class room teachers or nursing teachers (YOGO teachers) make sure that answers are completed, and then anonymize the questionnaires by covering the name of the child with black ink or by cutting off the name at the designated cut line for privacy protection.

(8) The cooperating schools will collect the questionnaires from all classes, confirm that the prefecture and school codes are properly entered, and return the questionnaires to JSSH.

Chapter 3. Overview of the Survey Results

1. Introduction

The “Health Status Surveillance of School Children” project of the Public Interest Incorporated Foundation Japan Society of School Health (JSSH) is an ongoing survey since 1992 that investigates highly significant aspects for the school children in relation to lifestyle-related diseases and their onset, such as their lifestyles, mental health, and allergies. Lifestyle-related diseases can be considered a group of diseases that are deeply related to school life in particular; it is a health challenge for modern school children. Therefore, a field investigation of children’s lives at school and home can provide evidence to form the foundation to manage and prevent lifestyle-related diseases. In addition to clarifying recent dynamics, understanding annual changes that will lead to a proper understanding of pathology and form a foundation for future approaches.

Lifestyle-related diseases are classified as diseases for which onset and progress involve lifestyle habits that can lead to heart disease or cerebrovascular disease as the main risk factor of atherosclerosis. High blood pressure, diabetes, dyslipidemia and obesity are commonly observed. In Japan, the Specific Health Check-up and Health Guidance program was introduced in 2008 for adults aged 40-74 with the purpose of early intervention against metabolic syndrome and the accumulation of risk factors by early diagnosis. Many people have been found positive or possibly positive for metabolic syndrome, suggesting that the program will be effective. However, the risk factors as an adult include those that have been accumulated from childhood, thus changing a familiar lifestyle is not always easy. The increase of childhood obesity in the global population has also been prominent from the 1970’s to 1980’s, and the significance of childhood lifestyle-related diseases has become widely recognized.

Mental health is also gaining attention as an important topic for modern children. Hospitals and clinics have indicated that the number of children with mental health complaints is increasing, and it is often the school or family that addresses the problems. However, detailed data on how schools or families are actually dealing with mental problems are insufficient.

There are some children with allergies, and how the school responds or responded to the exposure of allergens or attacks including emergencies often becomes a problem. Diseases that are increasing in number should also be addressed, and understanding the progress in treatment is also necessary.

JSSH aims to investigate these aspects over time by collecting the most recent data from nationwide as from a national organization. This project is highly appreciated not only as a research project but also as the provider of fundamental information for administrations, and a wide range of stakeholders including the media and school education are awaiting the results.

2 History

Since it started in 1992, this project has continuously investigated the risk factors of lifestyle-related diseases, lifestyles, mental health and allergies with the long-term goal to understand annual changes while modifying survey questions as needed. The survey was carried out annually in 1992, 1993 and 1994, and then every two years in 1996, 1998, 2000, 2002, 2004, 2006, 2008, 2010 and 2012 (every even-numbered years), and the results were tabulated and analyzed and issued as a report in the following year. Following the same procedure, this time the survey was conducted in FY2014, and statistical analysis was performed in FY2015 to issue a report.

Instruction manuals to provide guidance in the everyday lives of school children were also prepared as a related project based on the accumulated results. The *Desirable Lifestyle* (1999 and 2005) and the *Children’s Lifestyle Nurtured at Home and School* (2010) were published by JSSH with the purpose to help the school and home with daily-life guidance for children, and JSSH also discussed and prepared their revisions.

3. Contents

The items surveyed for risk factors for lifestyle-related diseases include body height and weight, blood pressures (systolic/diastolic), serum lipid levels (total cholesterol, HDL cholesterol

and LDL cholesterol in serum), and waist circumference.

The items surveyed for lifestyle were mainly related to exercise and meals, such as sleep/rest, rising, bowel movement, physical activity, diet, helping with domestic chores, studying at home, tutoring schools, lessons, computer games, exposure to the media including television, extracurricular activities, daily physical activities, diet behavior, social network services (SNS), and the Internet.

Mental health items were fully re-examined. The committee considered the commonality with the previous survey questions, and developed 18 questions in total. There were questions that include the wording of “Sometimes I think I want to die,” and the handling of the answers was carefully debated in consideration of practical consequences. The mental health effect among the school children due to the Great East Japan Earthquake was also evaluated to the best extent possible.

The items for allergies were also reviewed to include the prevalence and past history of various allergies, school responses, removal of allergens, effect on school life and the relationship to body shape.

The committee received proposals about survey items and methods from the school, and the results were tabulated after methods of statistical analysis were examined by the committee members in charge of statistics.

In this survey, we aimed to obtain a more realistic picture by targeting high schools of various curricula.

4. Overview of the Results

(1) Risk factors

The prevalence of obesity was determined by the percentage of overweight; the highest values were observed at age 11-12 for boys (13.4% at age 12) and age 15 for girls (10.3%) above all the ages in early childhood or adolescence.

In terms of the prevalence of obesity among elementary and junior high school children, no change was observed when the FY2014 results were compared to the earlier results since FY2006. The increase in childhood obesity in Japan has stopped in recent years, and this result supports this understanding; however, it should be interpreted that “the prevalence of obesity remains high even today,” considering that the prevalence of childhood obesity was only about 3% in 1970. The FY2014 survey also revealed an increase in obesity among the senior high school boys and girls, which is a new trend.

When the prevalence of thinness is determined by the percentage of overweight; boys aged 11-15 and girls aged 12-15 exhibited high values: the highest value was observed at age 15 for boys (2.4%) and age 12 for girls(4.3%) among all ages igthe highest value was observed at age 15 for boys (2.4%) and age 12 for girls (4.3%) among all ages in early childhood and adolescence. There were no major annual changes in terms of the prevalence of thinness, but this survey also showed that thinness among girls, which was 3.4% in junior high school and 2.3% in senior high school, is generally higher than that of boys and that it is higher among high school girls when compared to elementary school girls.

When the standard for an increased waist circumference is assumed to be 75cm or more for elementary school children and 80cm or more for junior high school students by applying the metabolic syndrome diagnosis standards for children in Japan, 16.1% of 5th and 6th grade boys, 10.6% of 5th and 6th grade girls, 13.0% of junior high school boys, and 8.6% of junior high school girls were determined to have an increased waist circumference. Similarly, when the standard for an increased waist circumference is assumed to be half of the respective height, 19.5% of 5th and 6th grade boys, 10.6% of 5th and 6th grade girls, 12.9% of junior high school boys, and 12.2% of junior high school girls were determined to have an increased waist circumference.

The prevalence of childhood hypertension is 0.1-1% according to many reports, and this survey also showed similar values. Reportedly, about 3% of adolescents including senior high school children have been reported to show high blood pressures; in this project, the prevalence of high blood pressures among high school boys fluctuates between 1.3% and 7.2%.

The prevalence of systolic hypertension and diastolic hypertension in upper-normal range continues to be higher in high school boys than in high school girls.

In terms of dyslipidemia evaluation, abnormality in the serum total cholesterol was found in

4.7%, 1.7% and 1.3% of boys and in 3.2%, 4.1% and 6.5% of girls in elementary school, junior high school, and senior high school, respectively. Abnormal levels of LDL cholesterol were found in 3.4%, 1.0% and 2.9% of boys and in 1.5%, 2.3% and 5.4% of girls in elementary school, junior high school, and senior high school, respectively. Abnormal levels of HDL cholesterol were found in 1.4%, 2.0% and 2.5% of boys and in 1.4%, 1.1% and 1.5% of girls in elementary school, junior high school, and senior high school, respectively. These figures are similar to previously reported results, and the annual change was also minimal.

When the correlation between physique and the risk factor indicators were examined, the scores of the obese group were statistically significant in all seven indicators, namely, systolic pressure, diastolic pressures, average blood pressure, total cholesterol, HDL cholesterol, LDL cholesterol, and arteriosclerosis index (note: HDL cholesterol was significantly lower, others were higher).

In the sub-analysis of the normal physique group, those who were determined to be normal in the overweight index were separated into two groups, one group for +15% body fat or greater and another group for the rest, and comparison of each risk factor by 3-year age groups (grades 1-3, grades 4-6, junior high school, and senior high school) was conducted.

In the group with +15% of the percentage of overweight or greater, the arteriosclerosis index was high across all age groups; in particular, grades 4-6, junior high school, and senior high school groups showed a statistical significance. This difference was associated with the significantly low levels of HDL cholesterol found in grades 1-3, grades 4-6, and junior high school groups.

(2) Lifestyle

In terms of regular bowel movement, 69.4% of boys and 51.6% of girls have a daily bowel movement, by answering either “I have a daily bowel movement at about the same time every day” or “I have a daily bowel movement but not always at the same time of the day.” Of these, those who answered “I eat less often than I do,” “I hardly eat,” or “I don't eat” a breakfast occupy 10.2% and 6.2% in grades 5-6, 13.8% and 7.0% in junior high school, and 22.9% and 10.9% in senior high school boys and girls, respectively (with statistical significance).

When compared by physique (thin, normal, or obese), more children answered that “I sometimes do not have a bowel movement for several days” among the thin boys and girls in grades 1-2, girls in grades 3-4, and high school boys and girls (with statistical significance).

In terms of breakfast status, 95.0% of boys and 95.7% of girls eat breakfast almost daily, by answering either “I eat every day” or “I eat more often than I don’t” about eating a breakfast.

In terms of skipping a breakfast, “I eat less often than I do,” “I hardly eat,” and “I don’t eat,” when combined, was highest among high school boys at 11.0%, followed by high school girls at 7.6%, junior high school boys at 6.3%, and junior high school girls at 5.7%.

With the exceptions of girls in grades 1-2 and grades 3-4, those who answered that “I eat every day” wake up earlier than those who answered “I don't eat” or “I hardly eat.”

When compared by physique (thin, normal, or obese), about 10% of junior high school girls and high school children who belong to the obese group answered that “I eat less often than I do” or “I hardly eat” (with statistical significance). Within the thin group of senior high school girls, the answers of “I hardly eat” and “I don't eat” were high at 15.7% (with statistical significance).

Compared to 10 years, ago, the proportion of children who eat breakfast increased by 0.1 to 4.7%, except for junior high school boys and high school girls.

When a question asked “Do you eat breakfast alone, not with any other family members?” 36.0% of boys and 35.6% of girls confirmed to eating breakfast alone by answering “very often” or “sometimes.”

When a similar question was asked about dinner, 14.8% of boys and 12.9% of girls answered “very often” or “sometimes.”

When asked the question “Do you eat again after dinner?” 12.9% of boys and 6.7% of girls answered “very often” or “sometimes.”

When a question was asked about food left on dishes, 19.9% of boys and 26.6% of girls answered “very often” or “sometimes.” When compared by body shape (thin, normal, or obese), the proportion of those who leave some food on their dishes was higher in the thin group than in the normal or obese group, except for boys in grades 3-4.

When compared by body shape (thin, normal, or obese), the proportion of those who answered that “I don’t want to get fat” was higher in the thin group than in the normal or obese group,

except for among girls in grades 3-4 and in high school.

About continuous snacking, 21.1% of boys and 21.8% of girls are eating snacks continuously, answering “very often” or “sometimes.” Of these, 9.3% of boys in grades 1-2, 5.6% of girls in grades 1-2, 15.4% of boys in grades 3-4, 16.2% of girls in grades 3-4, 13.9% of boys in grades 5-6, 14.9% of girls in grades 5-6, 13.6% of junior high school boys, 17.2% of junior high school girls, 29.9% of high school boys and 19.1% of high school girls (with statistical significance) answered “very often” or “sometimes.” When compared by body shape (thin, normal, or obese), more elementary school children in the normal and thin groups continuously eat snacks.

When a question asked what mainly constitutes a breakfast at home, 28.4% of boys and 28.8% of girls answered that they eat “only staple food,” overall. The answer of “staple food, a main dish, and a side dish” was second highest at 25.7% in boys and 25.1% in girls. The answer of “staple food and a main dish” occupied 25.2% in boys and 23.2% in girls, and “staple food and a side dish” was 17.9% in boys and 19.7% in girls. The answer of “others (fruits, beverages or snacks only)” occupied 1.7% in boys and 1.8% in girls.

When a question asked what mainly constitutes a dinner at home, 84.9% of boys and 85.3% of girls answered that they eat “staple food, a main dish, and a side dish.” For “staple food and a main dish,” 9.3% in boys and 8.3% in girls answered, and “staple food and a side dish” was about 4% for each gender.

When a question asked how a respondent feel about his/her body shape, “I feel that I am good as is” was the most common answer at 53.4% for boys and 41.6% for girls. For girls, however, the proportion of those who answered “I want to lose a little more weight” was also close, at 40.1%. “I want to lose a lot of weight” was 13.4% for girls but only 4.2% for boys whereas “I want to gain a little more weight” was 17.4% in boys but only 4.6% in girls.

When compared by physique (thin, normal, or obese), about 10% of junior high school boys, girls in grades 3-4 and junior high school girls as well as about 20% of high school girls in the thin group answered that “I want to lose a lot of weight” or “I want to lose a little more weight” (with statistical significance). In the obese group, on the other hand, the proportion of those who answered “I feel that I am good as is” for children in grades 1-2, junior high school boys, and high school boys was high at about 20% (with statistical significance).

When a question asked if the respondent has tried a diet, 88.0% of boys and 74.5% of girls answered “I have never actually tried.” Among high school girls, roughly one in two answered that “I have been on a diet before.” Of those, the answers of “I want to lose a lot of weight” and “I want to lose a little more weight” were more common (with statistical significance). With the exception of high school girls in the obese group, more than 50% answered that “I have never actually tried” (with statistical significance). Roughly 20-30% of high school girls in the obese group and 60% of high school girls in general answered “I have been on a diet based on my own ideas.” In the obese group, 21.1% of boys in grades 3-4 and about 15% of children in grades 5-6 answered either “I have been on a diet under the supervision of a doctor” or “I have been on a diet under the supervision of a school teacher.” “Others” account for 5-10% of responses, but the proportion was higher in the obese group than in the normal or thin group (with statistical significance).

Those who are regularly involved in extracurricular activities or physical activity during free time occupy 73.9% for boys and 56.2% for girls, about 75% for elementary school and junior high school children and 64.2% for senior high school children. For girls, it was about 70% for grades 1-4, and 57.9% for grades 5-6, 52.4% for junior high school, and 36.0% for senior high school children. These figures suggest that more boys regularly participate in physical activity than girls, and the proportion decreases as a child advances in school ages; senior high school girls in particular was remarkably low.

Those who belong to extracurricular physical activities or sport clubs could easily fall asleep and wake up compared to those who do not, and a fewer number of them felt a lack of sleep ($p< 0.01$). They also had better bowel movement and breakfast status ($p< 0.01$).

For boys, the average time of exercise in a week by intensity was 3:58 (hh:mm) (median 2:00; herein after the time in parenthesis refers to a median) for high-intensity exercise, 2:46 (1:30) for medium-intensity exercise, and 1:42 (1:00) for low-intensity exercise. For girls, the average time of high-intensity exercise was 3:24 (1:30), 2:19 (1:00) for medium-intensity exercise, and 1:29 (1:00) for low-intensity exercise.

When compared by school ages, the average time of high-intensity exercise tended to increase in higher grades; it was 2:13 (1:00) for grades 1-2, 3:27(2:00) for grades 3-4, 4:02 (3:00)

for grades 5-6, 4:13 (2:00) for junior high school, and 5:09 (2:30) for senior high school boys; 1:35 (1:00) for grades 1-2, 2:38 (1:00) for grades 3-4, 3:31 (2:00) for grades 5-6, 3:47 (2:00) for junior high school, and 5:02 (2:00) for senior high school girls.

The total time of exercise on average, including high, medium, and low intensity levels, was 5:46 (3:20) for boys and 4:05 (2:00) for girls. When compared by school age, it also tended to increase in higher grades in both boys and girls; it was 3:52 (2:30) for grades 1-2, 5:08 (4:00) for grades 3-4, 5:30 (4:00) for grades 3-6, 6:19 (3:30) for junior high school, and 7:48 (3:05) for senior high school boys; and 2:49 (2:00) for grades 1-2, 3:39 (2:00) for grades 2-4, 3:52 (2:00) for grades 3-6, 4:49 (2:00) for junior high school, and 4:59 (1:40) for senior high school girls. More children spent less time for exercise as the grades go higher; however, those who are involved in extracurricular physical activity in high schools spent more time engaged in activity, showing a bipolar distribution for the time of exercise.

Compared with the previous survey, the average time for exercise tended to decrease considerably across all school ages nationwide, and the data distribution showed less number of children with long hours.

When the total time of exercise was examined by body shape, boys in the obese group tended to spend less time in exercise than the normal group did across all school ages. The same was true for the thin group, except for grades 3-4, and the tendency of shorter time was more prominent especially in grades 5-6 and senior high school boys. For girls, there was no difference between the normal group and the obese group in elementary school, but the obese group tended to be shorter than the normal group in high schools. As for the thin group, its population size for elementary school was small and no evident tendency was confirmed, but high school children in the obese group tended to spend less time; senior high school children in particular spent half the time of the normal group for both boys and girls, devoting significantly less time for exercise.

The annual changes have shown a gradual decrease in exercise time, but this survey showed a marked reduction in high/medium-intensity exercise time in both boys and girls.

The energy consumption per 1 kg of weight is estimated to be 5.6 kcal for boys and 3.6 kcal for girls. Overall it tended to increase as school age advances, except it was less in senior high school girls. When compared to the FY2002 survey, energy consumption per 1 kg was clearly reduced at all ages.

Those who belong to extracurricular physical activities or sport clubs had lower diastolic blood pressure and higher HDL cholesterol compared to those who do not ($p< 0.05$).

As for reading, including books, newspapers, magazines, and anime comics, 80.6% of boys and 83.2% of girls were involved, spending 42 minutes on average among boys and 46 minutes on average among girls. Those who listen to music and/or radio occupied 57.9% for boys and 69.4% for girls; boys spent 0:58 on average and girls spent 1:58 on average.

Those who belong to extracurricular physical activity or sport clubs spent significantly less time reading, listening to music, playing games excluding online games, watching television, and using a mobile phone or smartphone, tablet, or computer statistically compared to those who do not; and they spent significantly less time on the Internet watching videos, playing online games, reading news, exchanging SNS and/or e-mails, and talking on a phone statistically. Those who play electric games excluding online games accounted for 74.6% in boys and 53.3% in girls. Those who watch television, videos, or DVDs were 94.5% for boys and 95.3% for girls. Mobile phone and smartphone users accounted for 43.0% for boys and 47.9% for girls. The average time spent using mobile phone and smartphones was 1:43 for boys and 1:48 for girls. Tablet and computer users accounted for 35.8% for boys and 32.9% for girls.

Time spent for games, the Internet and television were totaled as screen time. Screen time averaged 5:55 for boys and 5:40 girls. When the average time was examined by school age, it was 3:38 for boys in grades 1-2, 3:31 for girls 1-2, 3:58 for boys in grades 3-4, 3:33 for girls in grades 3-4, 4:33 for boys in grades 5-6, and 4:16 for girls in grades 5-6. Average screen time averaged 6:49 for junior high school boys, 6:36 for junior high school girls, 7:11 for senior high school boys and 7:01 for senior high school girls. The increase in Internet time observed in high school children is likely correlated with the sudden decrease in exercise time.

Those who have used SNS accounted for 30.7% among boys and 36.8% among girls whereas 32.6% of boys and 30.2% of girls never have. Those who have experienced troubles relating to the Internet accounted for 2.6% among boys and 4.2% among girls, and the majority is high school students. The nature of troubles included fictitious billing and one-click fraud for 40.5%

of boys and 16.3% of girls, chain mail for 39.7% boys and 61.9% girls, slander for 11.6% boys and 26.5% girls, and personal information leakage for 8.8% of boys and 10.9% of girls.

Those who study at home totaled 90.6% of boys and 92.6% of girls. The average time spent studying for boys was 1:07 and 1:15 for girls. The proportion of children who go to tutoring schools was 27.8% for boys and 27.5% for girls. When compared by school age, the proportion of students who attend tutoring schools was the lowest for grades 1-2 among both boys and girls with 16.1% for boys and 17.1% for girls. This figure gradually increases according to school ages advance, peaking with junior high school children at 45.0% for boys and 45.3% for girls; it then decreases to 16.0% for boys and 13.7% for girls in senior high schools.

Those who take lessons (excluding sports) totaled 22.2% for boys and 41.4% for girls; the girls were twice as high as the boys.

Those with abnormal LDL cholesterol levels tended to spend little time doing high-intensity exercise; however, there was no difference for medium- and low-intensity exercise times. The average time for boys and girls was 1:12 and 1:04, respectively. Many of those who have no problem falling asleep and waking up with good bowel movements tended to have a long exercise time in total.

When the average bedtime was compared by school age, it was 21:21 for boys in grades 1-2, 21:20 for girls in grades 1-2, 21:36 for boys in grades 3-4, 21:39 for girls in grades 3-4, 21:55 for boys in grades 5-6, 22:03 for girls in grades 5-6, 23:12 for boys in junior high school, 23:21 for girls in junior high school , 23:50 for boys in senior high school and 23:53 for girls in senior high school. The bedtime tended to be later in higher grades. In terms of gender across school ages, bedtime for girls was later than that of boys in grades 5-6 and junior high school ages.

When compared to a similar study conducted in FY1981 (*FY1981 School Children and Students Health Status Survey* by JSSH), bedtime has become later by 13 minutes for boys in grades 3-4, 23 minutes for girls in grades 3-4, 9 minutes for boys in grades 5-6, 15 minutes for girls in grades 5-6, 29 minutes for boys in junior high school and 28 minutes for girls in junior high school. When compared to the FY2004 survey of this project, bedtime has become earlier by 14 minutes for boys in grades 1-2, 7 minutes for girls in grades 1-2, 13 minutes for boys in grades 3-4, 9 minutes for girls in grades 3-4, 3 minutes for boys in grades 5-6, 5 minutes for girls in grades 5-6, 3 minutes for girls in junior high school, 16 minutes for boys in senior high school and 13 minutes for girls in senior high school. The bedtime of boys in junior high school was the same.

When the average time to wake up was compared by school y\grade, it was 6:35 for both boys and girls in grades 1-2, 6:36 for boys in grades 3-4, 6:35 for girls in grades 3-4, 6:39 for both boys and girls in grade 5-6, 6:37 for boys in junior high school, 6:32 for girls in junior high school, 6:38 for boys in senior high school and 6:32 for girls in senior high school.

The average hours of sleep per night was 9:14 for both boys and girls in grades 1-2, 9:00 for boys in grades 3-4, 8:56 for girls in grades 3-4, 8:43 for boys in grades 5-6, 8:36 for girls in grades 5-6, 7:25 for boys in junior high school, 7:10 for girls in junior high school, 6:48 for boys in senior high school and 6:38 for girls in senior high school. Average nightly hours of sleep tends to be shorter in higher grades. In terms of gender, there was no difference in grades 1-2. For other grades up to senior high school, boys had shorter hours of sleep than girls.

When compared to the FY1981 study (JSSH), the average hours of sleep have become shorter by 45 minutes for boys in grades 3-4, 42 minutes for girls in grades 3-4, 13 minutes for boys in grades 5-6, 19 minutes for girls in grades 5-6, 20 minutes for boys in junior high school, and 30 minutes for girls in junior high school.

Children who answered “I have trouble falling asleep,” accounted for 12.7% among boys and 15.2% among girls.

In terms of gender, the number in boys increased in higher grades. The same was also true for girls; however, the proportion was always higher in girls than in boys across all school ages.

In the FY2012 survey, children who answered "I have trouble falling asleep” accounted for 12.7% among boys and 15.2% among girls. In terms of gender, the proportion in boys increased in higher grades except for the senior high school. In girls, the proportion increased in higher grades, and it has always been higher among girls than boys across all school ages.

As for waking up, 29.3% of boys and 23.9% of girls answered “I woke up refreshed,” 53.3% of boys and 56.2% of girls answered “I was still a little sleepy,” and 17.4% of boys and 19.9% of girls answered “I was sleepy and had trouble waking up.” When compared by school age and gender, the answer “I woke up refreshed” tended to decrease in higher grades, and the proportion was

further less in girls than in boys. The answer “I was sleepy and had trouble waking up” increased in higher grades from grades 5-6 to senior high school, and the proportion was higher in girls across all school ages. The answer “I woke up refreshed” had decreased in all school ages compared to the FY2012 survey.

The answer “Lately I feel a lack of sleep” accounted for 34.4% among boys and 41.2% among girls, and the proportion tended to be higher in higher grades. In terms of gender, the proportion of girls was always higher than that of boys across all school years.

When children are asked about the cause of lack of sleep, 45.1% of both boys and girls answered that “Somehow, I stay up late” overall, followed by “I am watching television, DVD, or videos on the Internet” at 33.7% for boys and “I stay up late doing assignments and homework” at 40.7% for girls. Ranked in the third was “I stay up late doing assignments and homework” at 31.6% for boys and “I am watching television, DVD, or videos on the Internet” at 30.7% for girls, and fourth was “I am playing games” at 28.7% for boys and “I am engaged in social exchanges with someone using my mobile phone, smartphones, e-mails, etc.” at 20.1% for girls.

Of those who answered that “Lately I feel a lack of sleep,” those who answered “I regularly use a mobile phone or smartphone outside of school” were using such device 36 minutes longer than the overall average. When those who answered that “Lately I feel a lack of sleep” were asked “How many hours do you exercise on average in a week during your extracurricular activity or free time (excluding school curriculum such as physical education)?” the average was 6 hours and 51 minutes for boys and 5 hours and 21 minutes for girls.

When those who answered “Lately I feel a lack of sleep” and those who answered “Lately I do not feel a lack of sleep” were compared based on the membership status of extracurricular activity or local sport club, those with membership experienced a lack of sleep less than those without in both boys and girls of all school ages except for girls in grades 3-4. The result showed that those who are involved in physical activity in addition to extracurricular activity or local sports club experienced a lack of sleep less than those who do not in both boys and girls for all school ages.

The time to leave home for school was 07:30 for boys and 07:29 for girls. The duration at home after waking up till leaving for school was 55 minutes for boys and 57 minutes for girls.

(3) Mental health

1) Changes in survey methods

The items in the mental health survey were essentially based those that were modified and used in the previous survey; the exact question statement for Q35-2 was changed, and the wording about animals in Q35.3 and the part of “more than being with others” in Q35.5 were removed this time.

2) Survey results on mental health

On the topic of *depressive emotion*, in Q34.1, “Sometimes I feel like I don’t want to do anything because I feel depressed,” those who answered positively by answering “Often” or “Occasionally” accounted for 23.1% among boys and 28.2% among girls.

A similar tendency is also shown in Q34.2, “Sometimes I have trouble sleeping.” The positive group, "Often" and "Occasionally" combined, accounted for 18.6% among boys and 21.3% among girls.

The positive group of "Often" and "Occasionally" combined for Q34.5, “Sometimes I do not have an appetite” accounted for 13.8% among boys and 15.0% among girls.

In Q34.7, “Sometimes I think I want to die,” 85.7% of boys and 77.2% of girls responded “I do not feel so,” whereas 14.3% of boys and 22.8% of girls answered that “Sometimes I feel I want to die.”

Generally speaking, older children tended to answer positively for items on depression.

On the topic of *hyperactivity*, in Q34.3, “I cannot stay still because I cannot be calm,” 23.9% of boys and 18.4% of girls answered positively by answering either “Often” or “Occasionally.”

In Q34.4, “Sometimes I have trouble focusing or thinking fast,” 32.8% of boys and 29.5% of girls answered positively by answering “Often” or “Occasionally,” overall. The proportion of positive answers became higher in both boys and girls in junior high school ages and up, and slightly more girls answered positively than boys, reaching over 40%. On the contrary, those who answered “I do not feel so” was slightly higher in boys: 26.2% among those in junior high school and 25.7% among those in senior high school, while for girls it was 21.8% among those in junior

high school and 22.4% among those in senior high school .

On the topic of *emotions*, in Q34.6, “Sometimes I feel dull or easily tired,” 31.7% of boys and 34.2% of girls answered positively by answering “Often” or “Occasionally,” overall. The proportions of positive answers were roughly the same between boys and girls in elementary school, but girls were higher than boys in high schools.

In Q35.1, “Sometimes I suddenly feel angry, start crying, or feel happy,” the positive group who answered either “Very applicable” or “Applicable” accounted for 21.0% among boys and 29.1% among girls, overall.

On the topic of *behavior*, in Q35.2, “Sometimes I lose my temper over trivial things,” the positive group who answered “Very applicable” or “Applicable” accounted for 26.5% among boys and 25.8% among girls, overall.

In Q35.3, “I have gotten into a quarrel or fight or bullied other children,” the positive group who answered “Very applicable” or “Applicable” accounted for 7.5% among boys and 3.7% among girls, overall. It was 2.5% and 0.9% higher in boys and girls, respectively, compared to the last survey.

On the topic of *friends*, Q35.4, “I have been bullied or teased by other children,” the positive group who answered “Very applicable” or “Applicable” accounted for 14.0% among boys and 9.1% among girls, overall.

In Q35.5, “I prefer to be alone and often spend time playing alone,” the positive group who answered “Applicable often” or “Applicable” accounted for 19.9% among boys and 18.6% among girls, overall.

These answers were 5.1% higher among boys and 4.2% among girls when compared to the previous survey.

On the topic of *prosociality*, in Q35.6, “I care about other people’s feelings,” the positive group who answered “Very applicable” or “Applicable” accounted for 19.9% among boys and 18.6% among girls, overall.

In Q35.7, “I have gotten into a quarrel or fight or bullied other children,” the positive group who answered “Very applicable” or “Applicable” accounted for 59.0% among boys and 73.9% among girls, overall.

On the topic of *emotion of self-esteem*, in Q35.8, “I have few things I can boast about,” the positive group who answered “Very applicable” or “Applicable” accounted for 36.4% among boys and 39.9% among girls, overall. Fewer girls than boys responded with “Not applicable,” with the breakdown being 19.4% among boys in junior high school, 17.0% among boys in senior high school, 12.0% among girls in junior high school and 9.8% among girls in senior high school.

In Q35.9, “Sometimes I feel I am good for nothing,” the positive group who answered “Very applicable” or “Applicable” accounted for 22.3% among boys and 26.7% among girls, overall. The answer "Not applicable" accounted for 31.7% among boys in junior high school, 19.3% among girls in junior high school, 25.1% among boys in senior high school, and 19.0% among girls in senior high school.

On the topic of *suppressed anxiety*, in Q35.10, “I give up quickly when I think of doing something because I feel I won’t be able to do it,” the positive group who answered “Very applicable” or “Applicable” accounted for 31.5% among boys and 31.7% among girls, overall.

The *trend of temper dysregulation* was evaluated based on eight items in total from the items 1 through 6 in Q34 and items 1 and 2 in Q35.

There are 4 levels of answers available in Q34 and Q35, ranging from “Often (about once a week),”, “Occasionally (about once a month),” “Rarely (less than once a month),” to “No” for Q34 and from “Very applicable,” “Applicable,” “Rarely applicable,” to “Not applicable” for Q35; “Often” and “Occasionally” in Q34 and “Very applicable” and “Applicable” in Q35 were grouped together as positive answers in each question in the evaluation of the *trend of temper dysregulation* according to a flow-chart. In this survey, the positive answers accounted for 6.4% among boys in junior high school, 9.1% among girls in junior high school, 7.1% among boys in senior high school, and 9.5% among girls in senior high school.

The *trend of temper dysregulation* in the populations of disaster-affected regions was more evident among high school girls with over 10%, 7.7% among boys in junior high school, 10.1% among girls in junior high school, 6.4% among boys in senior high school, and 13.0% among girls in senior high school.

In the cross-analysis of mental health items and the Body Type 3 group, the following items

were statistically significant (p<0.05).

In Q34, two items were significant in boys (Q34.2 “Sometimes I have trouble sleeping [depression]” and Q34.5 “Sometimes I do not have an appetite [depression]”). In Q35, six items were statistically significant (Q35.2 “Sometimes I lose my temper over trivial things [behavior]), Q35.4 “I have been bullied or teased by other children [friends]), Q35.7 “I tend to willingly help my friend who is feeling depressed due to a problem or feeling obnoxious [prosociality]),” Q35.8 “I have few things I can boast [emotion of self-esteem],” Q35.9 “Sometimes I feel I am good for nothing [emotion of self-esteem],” and Q35.10 “I give up quickly when I think of doing something because I feel I won’t be able to do it [suppressed anxiety]).

In girls, the items other than Q34.5 “Sometimes I do not have an appetite” (depression), Q35.1 “Sometimes I suddenly feel angry, starts crying, or feel happy” (emotions), Q35.3 “I have gotten into a quarrel or fight or bullied other children” (behavior), and Q35.7 “I tend to willingly help my friend who is feeling depressed due to a problem or feeling obnoxious” (friends) were all statistically significant (p<0.05).

To note, the statistical significance for Q35.1 was 0.051.

Q34.7 “Sometimes I do not have an appetite” was statistically significant only in girls. Q35.1 “Sometimes I suddenly feel angry, starts crying, or feel happy” was not statistically significant in either boys or girls.

This cross-examination revealed that the influence of body type was statistically significant in many items, especially in the obese group and in particular among girls.

5 Allergies

1) Prevalence (currently diagnosed and previously diagnosed)

The survey items for allergy symptoms have been changed significantly compared to the last survey in FY2002. In this survey, the items on restrictions in daily school life due to atopic dermatitis were removed, and the prescription status for bronchial asthma was added as Q1-2.

On the topic of *current and past prevalence of allergic diseases based on professional diagnosis and school support*, the overall prevalence of bronchial asthma was 17.3%; 4.5% (boys 5.5%, girls 3.4%) being those who are currently diagnosed, and 12.6% being those who had been previously diagnosed. In terms of school ages, grades 1-2 were the highest at 6.7%; the figure tapered off with age and was down to 2.1% in high school children. In terms of gender, the figures were higher among boys until the end of junior high school, but there was no gender difference in high school. There was no significant difference among school ages in terms of previous diagnoses. The school support rate showed an increasing trend, rising from 11.0% from the last survey to 14.8%. This may partially be the consequence of the School Life Management Instruction Table (For Allergy) becoming popular among schools.

The overall prevalence of atopic dermatitis was 12.6%; 5.5% (boys/girls 5.8/5.2%) being those who are currently diagnosed, and 7.1% being those who had been previously diagnosed. When compared by school age group, the highest was children in grades 1-2 at 7.1% and the lowest was children in junior high school at 4.3%, and there was a decreasing tendency as age increased. The prevalence of past diagnoses was highest among children in senior high school at 8.8%, and lowest among children in grades 1-2 at 5.9%. There was no major difference in the overall prevalence, current and past diagnoses combined, across school years; it fluctuated in the range of 11 to 14%. This suggests that atopic dermatitis is not on an increasing trend like bronchial asthma is. Of the atopic dermatitis children, 7.5% of them received school support; no difference was found across school ages, and the figure fluctuated between 6 to 8%.

The prevalence of food allergy was 7.6% overall; 2.5% (boys 2.9, girls 2.1%) being those who are currently diagnosed, and 5.4% being those who had been previously diagnosed. There was no significant change across school age groups. In terms of previous diagnoses, it was the most abundant in grades 1-2 at 6.6% and gradually tapered off to 4.3% for children in senior high school. The overall prevalence, current and past diagnoses combined, was the highest at 9.8% in grades 1-2, 9.3% in grades 3-4, 7.6% in grades 5-6, 6.6% in junior high school, and 6.8% in senior high school. This shows that food allergy has been on an increasing trend over the last 12 years.

The overall prevalence of atopic dermatitis was 29.2%; 16.9% (boys 19.2%, girls 14.5%) being those who are currently diagnosed, and 12.3% being those who had been previously diagnosed. In terms of school year group, the highest was 18.8% in junior high school, and the lowest was 13.5% in grades 1-2. The prevalence of past diagnoses was highest in children in senior

high school at 14.9%, and children in grades 1-2 were the lowest at 8.0%.

This reveals the prevalence of atopic dermatitis diagnoses tends to increase with age. Overall, 4.6% were receiving school support. In terms of school year, the lowest was 2.4% for grades 1-2, and the highest was 6.8% for senior high school.

The overall prevalence of allergic conjunctivitis (including hay fever) was 13.2%; 5.9% (boys 6.1%, girls 5.6%) being those who are currently diagnosed, and 7.3% being those who had been previously diagnosed. The prevalence of past diagnosis was the lowest in grades 1-2 at 5.6%, and other school age groups remained around 7%. Overall, 6.2% were receiving school support, while the highest was 10.2% at senior high school.

The overall prevalence of cedar pollen allergy was 13.3%; 9.3% (boys 10.0%, girls 8.6%) being those who are currently diagnosed, and 4.0% being those who had been previously diagnosed.

There were no major changes with age in past diagnoses; the figures fluctuated in the range of 2.5 to 4.9%. Overall, 5.5% were receiving school support.

Other diseases seen included the sick building syndrome at 0.8%, 16.2% of which received school support, and the prevalence of the bee venom allergies was 0.1%.

Commonly used treatment for bronchial asthma included leukotriene receptor antagonists and steroids inhalants with over 40%, followed by the use of bronchodilator tapes, inhalers, and oral drugs. It is likely that this survey reflects the reality of bronchial asthma treatment in daily conditions in Japan better than other similar surveys directed by academic societies. The prescription rates of steroid inhalers were especially lower in this survey compared to the surveys of academic societies, particularly in some school ages; it was about 70% in grade 1 and 50% for high school children. The prescription rates of leukotriene receptor antagonists were generally lower across all school years in this survey; it was roughly 70 to 80% for elementary school children and 40 to 50% for high school children. The prescription rates of bronchodilators were generally higher in this survey across all school ages, at about two to four times more. Theophylline showed no particular trend unlike in the surveys of academic societies, and the results on oral steroid medicines were comparable to those from the surveys of academic societies.

Of the possible food items included in the survey as the cause of food allergy, the most common items were peanuts, (17.0%) followed by chicken eggs (16.4%); the least common item was soy (2.3%). It was calculated that peanuts, chicken eggs, shellfish, milk, fruits, fish eggs, and nuts have been removed from the diet of over 20,000 children based on physician diagnoses; and chicken eggs, fruits, shellfish, and buckwheat have been removed from the diet of over 20,000 children based on parental discretion.

The food items that have been removed per physician’s instruction belong to either those which prevalence decrease with age (chicken egg, milk, wheat, peanuts, buckwheat, nuts, fish eggs, sesame, etc.) and those that do not change (shellfish, fruits, fish, soy, etc.), in large. The food items that have been removed per parental discretion belong to either those which prevalence increase with age (shellfish, fruits, buckwheat, fish, etc.) or those that decrease (chicken egg, peanuts, nuts, fish eggs, etc.), in large. Unlike the diagnosis by physician, some food items show increasing tendencies.

To evaluate school support, the survey asked the parents of children receiving support at school whether the response by school is based on instructions from physician or not. Parents who submit professional instructions from physicians, such as the School Life Management Instruction Table (For Allergies), accounted for 38.1% of all respondents. In terms of school age, the highest was 58.2% in grades 1-2, and it continued to decrease with age at 44.4% in grades 3-4, 37.3% in grades 5-6, and 28.7% in junior high school. In senior high school, it was only 9.6%.

Regardless of the diagnosis of bronchial asthma, all parents were asked to answer the questions relating to bronchial asthma, which were prepared based on the questionnaire sheets of the International Study of Asthma and Allergies in Childhood (ISAAC), with respect to the events in the past 12 months.

When the question asked “Has a child experienced any wheezing or whistling in the chest in the last 12 months?,” 6.6% answered “Yes.” Those who answered yes to this question were then asked how often it happened in the last 12 months. As seen in the last survey, 0 times accounted for only 10.1%, 1-3 times was 68.9%, 4 to 12 times was 16.1%, and 13 times or more was 3.1%. Those who answered yes to wheezing in the last question (Q2-1) were also asked how often a child’s sleep was disturbed by his/her wheezing in the last 12 months. "Never” was the most

common answer at 49.9%; however, it means that the other half experienced a sleep problem during the night. "Once every few months" was 40.8%, "Once a month" was 2.7%, "Once a week" was 1.1%, and "More than once a week" was 2.9%. So, "Once a week" or more has reached 4.0%.

Those who answered yes to wheezing in the last question were also asked if a child was ever wheezing in between each breath in the last 12 months. "Yes" occupied 7.6%.

In terms of severity, the majority answered "1 to 3 attacks a year," which is classified as the intermittent type according to the guidelines. Those with 4 to 12 attacks a year reached 15.8%. Having wheezing in Q2-2 and having "13 attacks or more in a year" suggest that a child experiences attacks more than once a month, which corresponds to mild persistent type or worse in the severity according to the guidelines. Similarly, experiencing a sleep problem due to wheezing once or more in a week in Q2-3 the moderate persistent type or worse. To summarize, roughly 5% of children with bronchial asthma in each school year are controlling their symptoms poorly, and school years made no difference.

In terms of past history of anaphylaxis, 3.9% of children have experienced anaphylactic reactions and 0.6% (est. 64,353 children) have experienced anaphylactic shocks; there was no gender difference, and no major variation was found across school years.

The ratio of those who carry epinephrine, which accounted for 0.1% in the last survey, increased to 0.3% (est. 32.854 children) in this survey, of which 76.3% received school support. The estimated number of children who carry epinephrine amounts to roughly 32,000, suggesting that epinephrine response is becoming an essential school support at any school.

In the exhaustive survey conducted by the Ministry of Education, Culture, Sports, Science and Technology of Japan in 2013, the prevalence of anaphylaxis among school children was 0.6%, but the questions did not clearly define anaphylaxis. In another exhaustive survey that targeted 3rd grade children (approx. 6,000 children) in Sagamihara City, Kanagawa Prefecture, for which the definition of anaphylaxis was similar to this survey, the prevalence of anaphylactic reactions was 1.2%, and that of anaphylactic shocks was 0.04%. Compared to these results, the 3.9% for anaphylactic reasons and 0.6% for anaphylactic shocks observed in this survey are extremely high. Continuous monitoring and future investigation will be vital to study the true prevalence of anaphylaxis, considering that the results from the previous survey are similar to those of this survey. When placing the 0.6% prevalence of anaphylactic shocks at the baseline, 0.3% of epinephrine carrier is still a low ratio.

When the current diagnosis of allergic disease is investigated in relation to body type, its prevalence was 14.0% for the high obese group, 12.0% for the moderate obese group, 15.0% for the mild obese group, 13.5% for the normal group, 14.7% for the thin group, and 42.4% for the extremely thin group.

When the relationship between allergic disease and mental health was investigated, the odds ratio between the question of "Sometimes I lose my temper over trivial things" and the answers "Applicable" and "Not applicable" had the odds ratio of 0.638 (95% CI: 0.420-0.971) for bronchial asthma. In the answer options between "Applicable" and "Not applicable" in the question "I have been bullied or teased by other children," the odds ratio was 1.900 (95% CI: 1.117-3.233).

For atopic dermatitis, the odds ratios for answers such as "Sometimes I have trouble sleeping," I have been bullied or teased by other children," "I have few things I can boast," "I give up quickly when I think of doing something because I feel I won't be able to do it, "I get tense and cannot relax," and "Rarely applicable," were within the 95% confidence interval.

In terms of the relationship between food allergies and mental health, the odds ratio for the answer options of "I often feel so" and "I feel so" in the question of "I cannot stay still because I cannot be calm" was 1.953 (95%CI: 1.265-3.016). The odds ratio for "Very applicable" and "Not applicable" in the question "I sometimes get angry, start crying or feel happy all the sudden" was 1.762 (95%CI: 1.013-3.064). The odds ratio for "Rarely applicable" and "Not applicable" in the question "I have gotten into a quarrel or fight or bullied other children" was 0.703 (95%CI: 0.507-0.976). The odds ratio for "Rarely applicable" and "Not applicable" in the question "I have been bullied or teased by other children" was 1.511 (95%CI: 1.090-2.094). The odds ratio for "Very applicable" and "Not applicable" in the question "I have few things I can boast" was 0.605 (95%CI: 0.392-0.935).

For allergic conjunctivitis (including hay fever), the odds ratio for "I occasionally feel so" and "I do not feel so" in the question "Sometimes I have trouble sleeping" was 1.470 (95% CI: 1.173-1.842). The odds ratio for "Very applicable" and "Not applicable" in the question "I have been

bullied or teased by other children" was 1.721 (95%CI: 1.046-2.833). The odds ratio for "Rarely applicable" and "Not applicable" in the question "Sometimes I feel I am good for nothing" was 0.705 (95%CI: 0.510-0.975).

In terms of the relationship between the cedar pollen allergy and mental health, the odds ratios for the answer options were within the 95% confidence intervals in the questions such as "Sometimes I suddenly feel angry, starts crying, or feel happy," "Sometimes I lose my temper over trivial things," "I have few things I can boast," and "I give up quickly when I think of doing something because I feel I won't be able to do it."

For the sick building syndrome, the odds ratios for the answer options were within the 95% confidence intervals in the questions such as "Sometimes I feel like I don't want to do anything because I feel depressed," "I have been bullied or teased by other children," "Sometimes I feel like I don't want to do anything because I feel depressed."

Chapter 4. Overview of the Survey Results on Risk factors for Lifestyle-related Disease

Introduction

Lifestyle-related disease is defined as a group of diseases which onset and progress are associated with daily habits such as diet, exercise, rest, smoking, and eating. Its common examples include heart disease, hypertension, diabetes, and dyslipidemia, occupying 2/3 of the cause of death among Japanese. Findings from physical examination and laboratory tests that will likely lead to the onset of lifestyle-related disease are called risk factors.

The prevalence of childhood obesity has roughly tripled in 30 years from 1970 to 2000 in Japan, and a concern has been raised that adulthood obesity and lifestyle-related disease will significantly increase in the future. Thus, collecting and evaluating data on the risk factors for lifestyle-related disease among children and adults is essential.

One of the main purposes of this Surveillance of Health in School Children and Adolescents project is to evaluate and clarify the transition of lifestyle-related disease risk factors among children over time and to provide basic information for intervention and treatment against childhood metabolic syndrome and childhood lifestyle-related disease. Ultimately, the project also aims to prevent the onset of adulthood lifestyle-related disease by addressing metabolic syndrome and lifestyle-related disease during childhood years.

1 Subjects and Methods

1.1

For the 19,189 children (9,640 boys and 9,549 girls) of the elementary, junior high school, and high schools that agreed to cooperate in the project, physique was evaluated by height and weight for all of them; of them, waist circumference was evaluated in 2,216 children (1,122 boys and 1,094 girls), blood pressure was evaluated in 5,735 children (2,738 boys and 2,997 girls), and serum lipids was evaluated in 5,597 children (2,766 boys and 2,831 girls).

1.2 Survey items on risk factors for lifestyle-related disease

All measurements reported from each survey schools were aggregated. Weight, calculated physique index (and body mass index [BMI]), waist circumference (total length at the waist line), blood pressure (systolic and diastolic), calculated average blood pressure, serum lipid levels (total cholesterol, HDL cholesterol and LDL cholesterol in serum), and calculated arteriosclerosis index were used in the analysis.

1.3 Assessment criteria for lifestyle-related disease risk factors

1.3.1 Assessment criteria for obesity or thinness (the percentage of overweight, BMI, waist circumference)

The physical fitness index calculated from height and weight was used to determine obese or thin, and the result and its association to lifestyle-related disease risk factors were analyzed. The Ministry of Education, Culture, Sports, Science and Technology has been using the percentage of overweight calculated from the table of weights for height by gender and age (Table 1) in the *Revised Health Assessment Manual for School Children* (JSSH) to evaluate physique the reports on school health statistics since FY2006, so the same method was used to calculate overweigh in this project as well. The following description explains how the percentage of overweight was calculated and how BMI was used in the evaluation.

The waist circumference was measured and used as the indicator of abdominal obesity. The association with lifestyle-related disease risk factors was analyzed for each child who showed signs of abdominal obesity (increased waist circumference).

1) Formula for standard weight

In order to obtain standard weight for height by gender and age coefficients from Table 1 was entered into the following equation.

Standard weight (kg) = a × height (cm) - b (* Values for a and b were obtained from Table 1)

Table 1 Calculation of standard weight for height by gender and age

Boys		Age	Girls	
a	b		a	b
0.386	23.699	5	0.377	22.75
0.461	32.382	6	0.458	32.079
0.513	38.878	7	0.508	38.367
0.592	48.804	8	0.561	45.006
0.687	61.39	9	0.652	56.992
0.752	70.461	10	0.730	68.091
0.782	75.106	11	0.803	78.846
0.783	75.642	12	0.796	76.934
0.815	81.348	13	0.655	54.234
0.832	83.695	14	0.594	43.264
0.766	70.989	15	0.56	37.002
0.656	51.822	16	0.578	39.057
0.672	53.642	17	0.598	42.339

Note for Table 1:

This table of standard weight for height by gender and age are calculated based on the data of a normal group; it should be warned that this method may not provide correct standard weight for a child with abnormal height, i.e., a child whose height is below or above 2 standard deviations (SDs). Source: Ministry of Education, Culture, Sports, Science and Technology, Sports and Youth Bureau, School Health and Education Section, supervised; *School Medical examination Manual for School Children, Revised*; JSSH; March 2007.

2) Formula for the percentage of overweight

The following equation was used to calculate the percentage of overweight.

The percentage of overweight (%) = [(actual weight - standard weight) / standard weight] × 100

Table 2 Physique assessment criteria by the percentage of overweight

Highly obese	+50% or more
Moderately obese	+30% or more but less than +50%
Lightly obese	+20% or more but less than +30%
Normal	-20% to +20%
Thin	-20% or less
Highly thin	-30% or less

3) The basis for the standard weight

Nutritional status and other factors significantly improved after the second-world war, improving physique of Japanese children, but it seems to have reached a plateau around 2000. In June 2010, the Review Board for Standard Values on Physical Development of Children, a joint committee of the Japanese Society for Pediatric Endocrinology and the Japanese Association for Human Auxology, reached an agreement, that the values listed in the Ministry of Health, Labour and Welfare's *FY2000 Report on Physical Development Survey for Infants* and *FY2000 Report on School Health Statistics Survey* should be used as the standard values when comparing body heights and weights of Japanese children over time or assessing obese or thin. (Japanese Association for Human Auxology; Basic ideas on the evaluation of the Japanese children's physique http://www.auxology.jp/japanesechildren/Japanesechildren.pdf#search [in Japanese]). The values in Table 1 that were used in the analysis were obtained through the formula approximating these values.

4) BMI

The BMI (body mass index), an indicator of physique, is well established as the assessment index for obesity

or thinness among adults. For a child in pubertal stage, however, the BMI would increase as a child's height increases even though there is no change in the amount of body fat, so only the Kaup Index is used during the infant

1.3.3 Criteria for dyslipidemia

The evaluation criteria for serum lipid levels (total cholesterol, HDL cholesterol and LDL cholesterol in serum) of children in Japan are shown in Table 4.

Table 4 Assessment criteria for childhood dyslipidemia

Serum total cholesterol
Normal zone = less than 190 mg/dL
Border zone = more than 190 mg/dL and less than 220 mg/dL
Abnormal zone = 220 mg/dL or more
Serum HDL cholesterol
Low = less than 40 mg/dL
Serum LDL cholesterol
Normal zone = less than 110 mg/dL
Border zone = more than 110 mg/dL and less than 140 mg/dL
Abnormal zone = 140 mg/dL or more

Source: Okada, T., Murata, M., Yamauchi, K. et al: New Criteria of normal serum lipid levels in Japanese children. The nationwide study. Pediatric Int., 44: 596-601, 2002.

2 Results

2.1 Physical parameters

2.1.1 Height

The average, minimum, maximum, and SD of the subjects' height by gender and age are shown in the table below (Table 5). The figures observed for each age group were similar to the national averages for both boys and girls.

Table 5 Height(cm) by gender and age

Boys					Age	Girls				
Numbers	Mean	Min.	Max.	SD		Counts	Mean	Min.	Max.	SD
263	117.0	104.1	134.1	4.86	6	273	115.6	100.5	132.3	7.88
571	121.6	94.3	143.7	5.37	7	540	120.7	108.1	135.5	5.27
556	127.8	113.3	147.4	5.44	8	534	126.4	110.7	148.2	5.79
679	132.8	116.8	154.4	5.63	9	649	132.9	116.1	154.9	6.31
755	138.3	120.1	160.0	6.29	10	752	139.1	120.0	162.1	6.68
678	144.7	126.7	173.8	6.90	11	658	146.1	121.3	166.9	6.61
1,108	152.3	129.0	181.5	8.27	12	1,067	151.7	131.9	167.6	5.74
1,574	158.9	130.0	180.7	7.79	13	1,457	154.2	130.5	170.8	5.44
1,056	164.6	139.3	187.1	6.80	14	1,060	156.1	134.0	174.5	5.45
1,148	167.6	144.5	191.2	6.05	15	1,201	156.5	142.6	176.3	5.26
605	169.0	146.1	188.2	6.04	16	658	157.1	133.7	181.5	5.48
358	169.7	150.4	185.2	5.77	17	387	157.0	142.9	174.3	5.30

(Age 18 was omitted due to small sample size.)

2.1.2 Weight

The average, minimum, maximum, and SD of the subjects' weight by gender and age are shown in the table below (Table 6). The figures observed for each age group were similar to the national averages for both boys and girls.

Table 6 Weight (kg) (by gender and age)

Boys					Age	Girls				
Number	Mean	Min.	Max.	SD		Counts	Mean	Min.	Max.	SD
263	21.7	15.9	38.1	3.59	6	274	21.0	12.6	35.5	2.93
571	23.5	14.7	46.0	3.92	7	540	23.3	15.8	44.5	3.78
556	27.1	17.3	57.8	5.48	8	534	26.1	16.5	51.4	4.97
678	30.3	18.5	64.1	6.19	9	648	30.1	19.8	64.6	6.18
754	34.2	20.7	69.0	7.83	10	752	33.7	19.8	65.4	7.00
678	38.4	21.4	84.0	8.38	11	658	38.6	23.7	74.3	8.04
1,109	44.7	23.9	113.9	10.33	12	1,067	43.8	24.7	96.9	8.15
1,572	49.0	24.6	103.6	10.17	13	1,456	47.3	25.6	103.5	7.92
1,055	54.2	26.9	116.4	10.42	14	1,057	50.2	22.8	85.0	7.60
1,148	57.6	29.5	105.4	9.90	15	1,201	51.4	32.0	86.2	8.19
606	60.3	37.7	113.4	10.55	16	657	51.5	33.0	96.8	7.53
358	62.6	41.6	134.5	11.63	17	387	53.3	36.0	104.8	8.86

(Age 18 was omitted due to small sample size.)

2.1.3 The percentage of overweight

Based on the criteria shown in Table 2, each subject was categorized into a “highly thin,” “thin,” “normal physique,” “lightly obese,” “moderately obese,” or “highly obese” group based on his/her overweight index value. The counts are shown in Table 7, and the percentages by age are shown in Table 8.

Obesity (i.e., total of lightly, moderately, and highly obese) was most common at ages 11-12 for boys and age 15 for girls; the highest level was at age 12 for boys (13.4%) and age 15 for girls (10.3%).

Thinness (i.e., total of highly thin and thin) was most common at ages 11-15 for boys and ages 12-15 for girls; the highest level was at age 15 for boys (2.4%) and age 12 for girls (4.3%).

Table 7 Numbers of children with thinness or obesity

Boys							Age	Girls						
Highly thin	Thin	Normal physique	Lightly obese	Moderately obese	Highly obese	Total counts		Highly thin	Thin	Normal physique	Lightly obese	Moderately obese	Highly obese	Total counts
0	1	247	8	5	2	263	6	0	0	265	7	0	1	273
0	3	537	24	5	2	571	7	0	3	507	17	8	5	540
0	2	512	16	22	4	556	8	0	5	492	28	6	3	534
1	2	614	30	26	5	678	9	0	13	569	35	26	5	648
0	13	642	56	30	13	754	10	0	13	676	29	32	2	752
0	16	571	52	31	8	678	11	0	13	595	22	21	7	658
0	20	939	72	54	23	1,108	12	2	44	924	47	38	12	1,067
0	22	1,396	74	57	23	1,572	13	2	44	1,287	62	40	21	1,456
0	16	929	51	42	17	1,055	14	1	30	947	37	33	9	1,057
0	28	1,024	51	31	14	1,148	15	2	32	1,043	64	49	11	1,201
1	9	540	22	18	15	605	16	2	12	598	25	15	5	657
0	6	312	18	13	9	358	17	0	3	344	19	12	9	387

(Age 18 was omitted due to small sample size.)

Table 8 Incidence of thinness and obesity (%)

Boys							Age	Girls						
Highly thin	Thin	Normal physique	Lightly obese	Moderately obese	Highly obese	Total counts		Highly thin	Thin	Normal physique	Lightly obese	Moderately obese	Highly obese	Total counts
0.0%	0.4%	93.9%	3.0%	1.9%	0.8%	100.0%	6	0.0%	0.0%	97.1%	2.6%	0.0%	0.4%	100.0%
0.0%	0.5%	94.0%	4.2%	0.9%	0.4%	100.0%	7	0.0%	0.6%	93.9%	3.1%	1.5%	0.9%	100.0%
0.0%	0.4%	92.1%	2.9%	4.0%	0.7%	100.0%	8	0.0%	0.9%	92.1%	5.2%	1.1%	0.6%	100.0%
0.1%	0.3%	90.6%	4.4%	3.8%	0.7%	100.0%	9	0.0%	2.0%	87.8%	5.4%	4.0%	0.8%	100.0%
0.0%	1.7%	85.1%	7.4%	4.0%	1.7%	100.0%	10	0.0%	1.7%	89.9%	3.9%	4.3%	0.3%	100.0%
0.0%	2.4%	84.2%	7.7%	4.6%	1.2%	100.0%	11	0.0%	2.0%	90.4%	3.3%	3.2%	1.1%	100.0%
0.0%	1.8%	84.7%	6.5%	4.9%	2.1%	100.0%	12	0.2%	4.1%	86.6%	4.4%	3.6%	1.1%	100.0%
0.0%	1.4%	88.8%	4.7%	3.6%	1.5%	100.0%	13	0.1%	3.0%	88.4%	4.3%	2.7%	1.4%	100.0%
0.0%	1.5%	88.1%	4.8%	4.0%	1.6%	100.0%	14	0.1%	2.8%	89.6%	3.5%	3.1%	0.9%	100.0%
0.0%	2.4%	89.2%	4.4%	2.7%	1.2%	100.0%	15	0.2%	2.7%	86.8%	5.3%	4.1%	0.9%	100.0%
0.2%	1.5%	89.3%	3.6%	3.0%	2.5%	100.0%	16	0.3%	1.8%	91.0%	3.8%	2.3%	0.8%	100.0%
0.0%	1.7%	87.2%	5.0%	3.6%	2.5%	100.0%	17	0.0%	0.8%	88.9%	4.9%	3.1%	2.3%	100.0%

(Age 18 was omitted due to small sample size.)

2.1.4 Physique evaluation BMI

The average and SD of the BMI by gender and age calculated from height and weight are shown in the table below (Table 9). The BMI percentile is normally used to assess the physique of children who become taller as they grow, so the 50th percentiles by gender and age from the FY2000 survey on school health statistics are also shown for reference.

In this project, the analysis is carried out based on the physique assessment by the percentage of overweight because the project requires continuous analysis since the FY1992 data.

Table 9 BMI (by gender and age)

Boys						Age	Girls					
Counts	Mean	Min.	Max.	SD	FY2000 50%ile		Counts	Mean	Min.	Max.	SD	FY2000 50%ile
263	15.8	12.5	27.0	1.85	15.5	6	273	15.7	12.1	23.8	1.46	15.5
571	15.8	11.7	25.9	1.73	15.7	7	540	15.9	12.0	27.7	1.85	15.7
556	16.5	12.0	31.2	2.43	16.0	8	534	16.2	12.3	30.3	2.13	16.0
678	17.1	10.7	35.2	2.59	16.5	9	648	16.9	12.2	29.4	2.47	16.5
754	17.7	12.6	32.2	3.05	17.1	10	752	17.3	13.3	32.6	2.57	17.2
678	18.2	12.6	34.1	3.04	17.7	11	658	18.0	12.8	34.1	2.76	17.9
1,108	19.1	12.9	38.3	3.25	18.4	12	1,067	18.9	12.9	38.3	2.92	18.8
1,572	19.2	13.0	37.8	3.00	19.1	13	1,456	19.8	12.4	39.3	2.99	19.6
1,055	20.0	12.6	38.7	3.13	19.7	14	1,057	20.6	12.7	34.4	2.80	20.2
1,148	20.5	14.1	36.8	3.02	20.3	15	1,201	21.0	13.5	36.8	3.04	20.7
605	21.1	14.0	37.8	3.28	20.7	16	657	20.8	14.5	40.3	2.76	20.9
358	21.7	16.0	44.5	3.53	.21.0	17	387	21.6	16.1	42.8	3.39	20.9

2.1.5 Physique assessment by waist circumference

Physique assessment was also carried out using the waist circumference data as an indicator of obesity, in particular the abdominal obesity.

When the criteria for an abnormal waist circumference is assumed to be 75cm or more for elementary school children and 80cm or more for junior high school students, 16.1% of the 5th and 6th grade boys, 10.6% of the 5th and 6th grade girls, 13.0% of junior high school boys, and 8.6% of junior high school girls were determined to have abnormal waist circumference.

When the criteria for an abnormal waist circumference is assumed to half of his/her body height or more, 19.5% of the 5th and 6th grade boys, 10.6% of the 5th and 6th grade girls, 12.9% of junior high school boys, and 12.2% of junior high school girls were determined to have an abnormal waist circumference.

Table 10 Waist circumference measurements (by gender and age, in cm)

Boys			Age group	Girls		
Counts	Mean	SD		Counts	Mean	SD
61	54.7	4.7	Elementary School Grades 1-2	67	55.0	5.6
262	61.2	8.3	Elementary School Grades 3-4	269	59.4	7.7
87	65.3	8.6	Elementary School Grades 5-6	85	63.7	8.7
706	70.1	9.9	Junior high school Grades 7-9	664	69.2	8.0

(The age group for senior high school grades was omitted due to small sample size.)

Table 11 The prevalence of abnormal waist circumference (criterion: 75cm or more for elementary school grades and 80cm or more for junior high school grades; real counts and percentages)

Boys			Age group	Girls		
Normal	Increased	Total counts		Normal	Increased	Total counts
61 (100.0)	0 (0.0)	61 (100.0)	Elementary School Grades 1-2	66 (98.5)	1 (1.5)	67 (100.0)
245 (93.5)	17 (6.5)	262 (100.0)	Elementary School Grades 3-4	254 (94.4)	15 (5.6)	269 (100.0)
73 (83.9)	14 (16.1)	87 (100.0)	Elementary School Grades 5-6	76 (89.4)	9 (10.6)	85 (100.0)
614 (87.0)	92 (13.0)	706 (100.0)	Junior high school Grades 7-9	607 (91.4)	57 (8.6)	664 (100.0)

Table 12 The prevalence of abnormal waist circumference (criterion: half of body height or more; real counts and percentages)

Boys			Age group	Girls		
Normal	Increased	Total counts		Normal	Increased	Total counts
57 (93.4)	4 (6.6)	61 (100.0)	Elementary School Grades 1-2	60 (89.6)	7 (10.4)	67 (100.0)
215 (82.1)	47 (17.9)	262 (100.0)	Elementary School Grades 3-4	239 (88.8)	30 (11.2)	269 (100.0)
70 (80.5)	17 (19.5)	87 (100.0)	Elementary School Grades 5-6	76 (89.4)	9 (10.6)	85 (100.0)
615 (87.1)	91 (12.9)	706 (100.0)	Junior high school Grades 7-9	583 (87.8)	81 (12.2)	664 (100.0)

(The age group for senior high school grades was omitted due to small sample size.)

2.2 Blood pressure

2.2.1 Prevalence of hypertension

Hypertension and high-normal blood pressure were assessed based on the criteria of childhood and adolescent hypertension (Table 2) reported by the Japanese Society of Hypertension. Systolic hypertension and diastolic hypertension are each shown in the tables below (Tables 13 and 14, respectively).

Previous reports suggest that the prevalence of childhood hypertension roughly 0.1-0.11%; this survey also showed similar values. However, the prevalence of systolic blood pressure in high-normal range was 18.6%, which has risen from the 11.8% of the last survey.

Table 13 Prevalence of systolic hypertension (real counts and %)

Boys				Age group	Girls			
Hypertension	High-normal BP	Normal	Total counts		Hypertension	High-normal BP	Normal	Total counts
2 2.5%	3 3.8%	74 93.7%	79 100.0%	6-8	0 0.0%	2 2.5%	79 97.5%	81 100.0%
2 0.4%	13 2.4%	531 97.3%	546 100.0%	9-11	0 0.0%	12 2.2%	524 97.8%	536 100.0%
23 1.6%	90 6.1%	1,354 92.3%	1,467 100.0%	12-14	14 1.0%	124 8.9%	1,257 90.1%	1,395 100.0%
8 1.3%	115 18.6%	496 80.1%	619 100.0%	15-17	2 0.2%	60 6.4%	875 93.4%	937 100.0%

(Age 18 was omitted due to small sample size.)

Table 14 Prevalence of diastolic hypertension (real counts and %)

Boys				Age group	Girls			
Hypertension	High-normal BP	Normal	Total counts		Hypertension	High-normal BP	Normal	Total counts
1 1.3%	4 5.1%	74 93.7%	79 100.0%	6-8	0 0.0%	10 12.3%	71 87.7%	81 100.0%
5 0.9%	51 9.3%	490 89.7%	546 100.0%	9-11	5 0.9%	50 9.3%	481 89.7%	536 100.0%
7 0.5%	209 14.2%	1,251 85.3%	1,467 100.0%	12-14	21 1.5%	208 14.9%	1,166 83.6%	1,395 100.0%
5 0.8%	82 13.2%	532 85.9%	619 100.0%	15-17	11 1.2%	105 11.2%	821 87.6%	937 100.0%

(Age 18 was omitted due to small sample size.)

2.3 Serum lipids

2.3.1 Cholesterol, HDL cholesterol and LDL cholesterol

The prevalence of abnormal levels of total serum cholesterol, HDL cholesterol, and LDL cholesterol are shown in the table below (Table 15).

Table 15 The frequency of outliers for serum lipids (real counts and %)

Boys						Age group	Girls					
Total cholesterol		LDL-C		HDL-C			Total cholesterol		LDL-C		HDL-C	
Abnormal	Total counts	Abnormal	Total counts	Abnormal	Total counts		Abnormal	Total counts	Abnormal	Total counts	Abnormal	Total counts
35 4.7%	739 100.0%	17 3.4%	493 100.0%	9 1.4%	658 100.0%	6-11	23 3.2%	718 100.0%	7 1.5%	462 100.0%	9 1.4%	655 100.0%
28 1.7%	1,605 100.0%	9 1.0%	915 100.0%	30 2.0%	1,494 100.0%	12-14	63 4.1%	1,550 100.0%	20 2.3%	868 100.0%	15 1.1%	1,421 100.0%
5 1.3%	376 100.0%	4 2.9%	140 100.0%	8 2.5%	320 100.0%	15-17	33 6.5%	508 100.0%	9 5.4%	168 100.0%	6 1.5%	410 100.0%

3 Results (statistical analysis)

Obesity is known to lead to the development of lifestyle-related diseases. This project aims to detect young children with risk factors for lifestyle-related disease at early stage by clarifying the relationship between the indicators of obesity and thinness and other risk factors.

3.1 Relationship between physique and risk factors: Comparison of thin, normal, and obese children (based on all categories)

All subjects were divided into three groups, thin, normal, or obese, based on the percentage of overweight , and risk factors for each group were compared (Table 16).

Table 16 Risk factors of each physique group: Comparison of thin, normal, and obese group (based on all categories)

Overweight index / Indicator	Thin group			Normal group			Obese group		
	Percentage of overweight ≤-20%			-20% <percentage of overweight < +20%			≤ percentage of overweight +20%		
	Counts	Mean	SD	Counts	Mean	SD	Counts	Mean	SD
Systolic BP	123	106.0	9.8	4,888	109.0	12.2	561	114.7	11.4
Diastolic BP	123	60.3	7.9	4,888	60.7	9.1	561	63.3	8.9
Average blood pressure	123	75.5	7.6	4,887	76.8	9.0	561	80.4	8.4
Total cholesterol	123	167.0	26.8	4,836	167.5	26.0	578	170.4	27.9
HDL cholesterol	109	66.1	12.8	4,366	64.3	12.9	518	55.4	11.3
LDL cholesterol	71	90.3	24.0	2,615	90.1	22.2	364	97.5	24.0
Arteriosclerosis index	109	1.6	0.5	4,354	1.7	0.5	516	2.2	0.7

When compared to the normal group, the scores of the obese group were statistically significant in all seven risk factors shown above (HDL cholesterol was significantly lower, others were higher).

3.2 Relationship between physique and risk factors: Comparison of normal and obese children (By age group; namely, grades 1-3, grades 4-6, junior high school grades, and senior high school grades)

Subjects were categorized by age group (grades 1-3, grades 4-6, junior high school grades, and senior high school grades) and then divided into three groups (thin, normal, or obese) based on the percentage of overweight, and risk factors for each group were compared as shown in Table 17 (only the comparison between the normal group and obese group is shown).

The systolic pressure, diastolic pressures, average blood pressure, HDL cholesterol, and arteriosclerosis index were statistically significant for the obese group across all age groups (HDL cholesterol was significantly lower, others were higher).

The obese group tended to have higher LDL cholesterol across all age groups, but only age group that was statistically significant was that of the junior high school grades. The total cholesterol was significantly higher only for the obese group of the junior high school and senior high school groups.

Table 17 Risk factors of each physique group: Comparison of normal and obese groups
(By age group; namely, grades 1-3, grades 4-6, junior high school grades, and senior high school grades)

Age group	Percentage of overweight / Risk factors	Normal group: -20% < percentage of overweight <+20%			Obese group: +20% ≤ percentage of overweight			Comparison between groups (* with statistical significance)	
		Counts	Mean	SD	Counts	Mean	SD	*t* value	*p* value
Elementary school Grades 1-3	Systolic BP	161	100.2	11.5	16	105.5	9.2	-2.609	0.011*
	Diastolic BP	161	56.9	9.4	16	63.7	9.9	-2.571	0.012*
	Average blood pressure	161	71.3	9.1	16	77.7	8.4	-2.952	0.004*
	Total cholesterol	204	173.7	26.5	23	172.5	24.3	0.216	0.829*
	HDL cholesterol	125	63.6	11.6	14	55.1	11.1	5.951	0.000*
	LDL cholesterol	43	90.4	27.9	3	115.8	24.9	-1.502	0.138
	Arteriosclerosis index	125	1.8	0.5	14	2.1	0.6	-2.677	0.009*
Elementary school Grades 4-6	Systolic BP	949	103.9	11.0	146	110.6	9.6	-6.906	0.000*
	Diastolic BP	949	58.2	8.8	146	62.4	8.6	-5.701	0.000*
	Average blood pressure	949	73.4	8.5	146	78.5	7.6	-7.510	0.000*
	Total cholesterol	1,106	170.9	24.9	150	172.3	28.9	-0.408	0.684
	HDL cholesterol	1,054	64.6	13.1	144	55.4	10.5	7.717	0.000*
	LDL cholesterol	810	93.6	21.1	118	98.9	24.1	-1.862	0.067
	Arteriosclerosis index	1,053	1.7	0.5	143	2.2	0.7	-6.550	0.000*
Junior high school	Systolic BP	2,552	111.2	10.9	293	118.0	11.1	-7.967	0.000*
	Diastolic BP	2,552	60.9	8.5	293	62.8	8.8	-3.249	0.002*
	Average blood pressure	2,551	77.7	8.2	293	81.2	8.5	-5.931	0.000*
	Total cholesterol	2,906	164.6	25.8	320	168.2	27.1	-2.326	0.022*
	HDL cholesterol	2,688	64.2	13.0	299	55.0	11.7	12.061	0.000*
	LDL cholesterol	1,615	86.8	21.6	218	95.5	23.6	-7.297	0.000*
	Arteriosclerosis index	2,677	1.6	0.5	298	2.2	0.8	-13.300	0.000*
Senior high school	Systolic BP	1,226	114.1	12.2	106	118.9	11.9	-4.527	0.000*
	Diastolic BP	1,226	64.7	9.1	106	66.3	9.0	-2.339	0.022*
	Average blood pressure	1,226	81.2	8.7	106	83.9	8.6	-4.291	0.000*
	Total cholesterol	620	165.7	28.1	85	171.8	29.0	-3.919	0.000*
	HDL cholesterol	499	64.2	12.5	61	57.1	12.3	3.808	0.000*
	LDL cholesterol	147	92.3	27.2	25	97.1	23.2	-1.849	0.069
	Arteriosclerosis index	499	1.6	0.5	61	2.1	0.8	-3.026	0.003*

3.3 Relationship between physique and risk factors: Sub-analysis of normal weight group

The subjects who were determined to have normal weight (the percentage of overweight of more than -20% and less than +20%) were further divided into two groups by the overweight index (+15% and more or others), and risk factors of each group were compared by age group (grades 1-3, grades 4-6, junior high school grades, and senior high school grades).

In the group with the percentage of overweight index of +15% or more, the arteriosclerosis index was high across all age groups; in particular, grades 4-6, junior high school, and senior high school groups showed a statistical significance. This difference was associated with the significantly low levels of HDL cholesterol found in grades 1-3, grades 4-6, and junior high school groups.

The systolic blood pressure in the overweight group was significantly higher than that in the normal body weight group for the junior high school group.

Table 18 Risk factors of each physique group: Sub-analysis of normal weight group (between two groups with the percentage of overweight of +15% or more and less than +15%)
(By age group; namely, grades 1-3, grades 4-6, junior high school grades, and senior high school grades)

Age group	Overweight index / Indicator	Normal group (< +15%) -20% < overweight < +15%			Normal group (≥ +15%) +15% ≤ overweight < +20%			Comparison between groups (* with statistical significance)	
		Counts	Mean	SD	Counts	Mean	SD	*t* value	*p* value
Elementary school Grades 1-3	Systolic BP	157	100.3	11.5	4	95.8	13.3	0.642	0.523
	Diastolic BP	157	56.9	9.4	4	57.9	9.6	-0.190	0.849
	Average blood pressure	157	71.3	9.0	4	70.5	10.9	0.142	0.887
	Total cholesterol	198	173.9	26.7	6	169.7	18.1	0.603	0.548
	HDL cholesterol	122	63.8	11.7	3	55.0	3.8	2.646	0.010*
	LDL cholesterol	42	89.9	28.0	1	112.0	0.0	-4.669	0.000*
	Arteriosclerosis index	122	1.7	0.5	3	2.1	0.5	-1.121	0.266
Elementary school Grades 4-6	Systolic BP	898	103.8	10.9	51	104.6	12.5	-0.314	0.754
	Diastolic BP	898	58.3	8.7	51	56.9	9.1	0.797	0.428
	Average blood pressure	898	73.5	8.4	51	72.8	9.6	0.355	0.724
	Total cholesterol	1,047	170.7	24.8	59	175.7	25.9	-1.318	0.191
	HDL cholesterol	999	64.8	13.1	55	61.2	11.9	2.186	0.032*
	LDL cholesterol	761	93.1	20.9	49	100.5	23.9	-1.790	0.078
	Arteriosclerosis index	998	1.7	0.5	55	2.0	0.6	-2.826	0.006*
Junior high school	Systolic BP	2,401	111.1	10.9	151	113.3	11.1	-2.157	0.034*
	Diastolic BP	2,401	61.0	8.6	151	60.7	7.9	0.366	0.715
	Average blood pressure	2,400	77.6	8.3	151	78.3	7.9	-0.788	0.433
	Total cholesterol	2,738	164.7	25.8	168	162.7	26.1	1.073	0.286
	HDL cholesterol	2,531	64.6	13.0	157	58.8	11.3	6.505	0.000*
	LDL cholesterol	1,504	86.6	21.5	111	89.6	23.2	-1.491	0.141
	Arteriosclerosis index	2,520	1.6	0.5	157	1.8	0.6	-4.737	0.000*
Senior high school	Systolic BP	1,170	114.1	12.3	56	115.7	10.9	-1.162	0.248
	Diastolic BP	1,170	64.7	9.1	56	64.8	9.1	-0.045	0.965
	Average blood pressure	1,170	81.2	8.7	56	81.7	8.6	-0.642	0.522
	Total cholesterol	586	165.3	27.6	34	173.0	35.4	-5.325	0.000*
	HDL cholesterol	471	64.2	12.6	28	63.5	11.9	0.501	0.618
	LDL cholesterol	140	92.0	27.0	7	97.2	29.1	-0.697	0.488
	Arteriosclerosis index	471	1.6	0.5	28	1.8	0.7	-2.450	0.017*

4 Annual change

4.1 Annual change in obesity and thinness

The figures below illustrates the annual change by gender in the prevalence of obesity (as the total of lightly, moderately, and highly obese) and that of thinness (as the total of highly thin and thin) determined by the overweight index (Figs. 1 and 2).

The 2014 survey did not observe any change in the prevalence of obesity for junior high school and senior high school grades; however, senior high school boys and girls showed an increase.

There was no major annual change in terms of the prevalence of thinness, but this survey also showed that the girls' thinness, which was 3.4% in junior high school and 2.3% in senior high school, is generally higher than that of boys and that high school girls have are higher than elementary school girls.

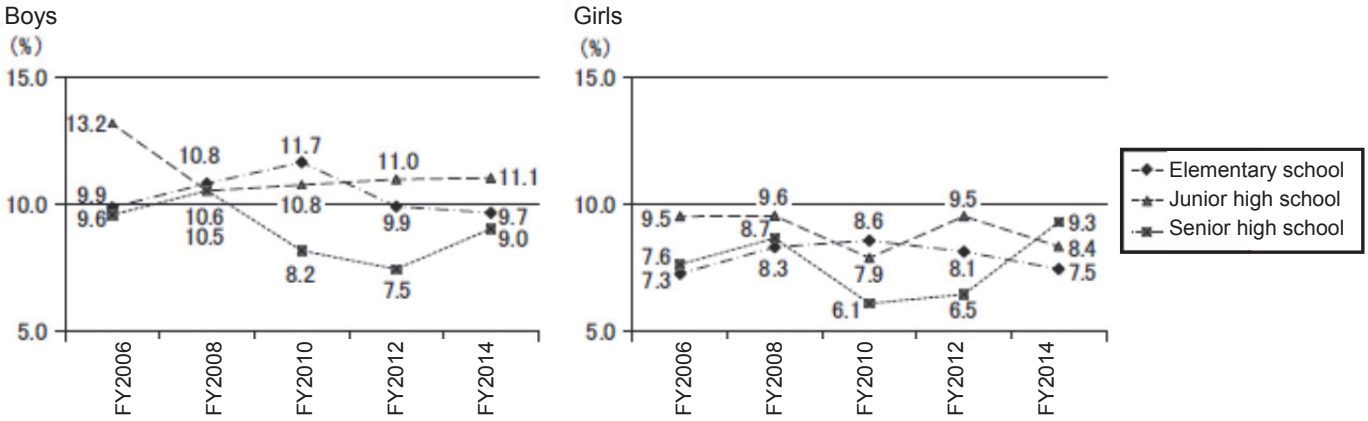

Figure 1 Annual change in the prevalence of obesity (as the total of lightly, moderately, and highly obese)

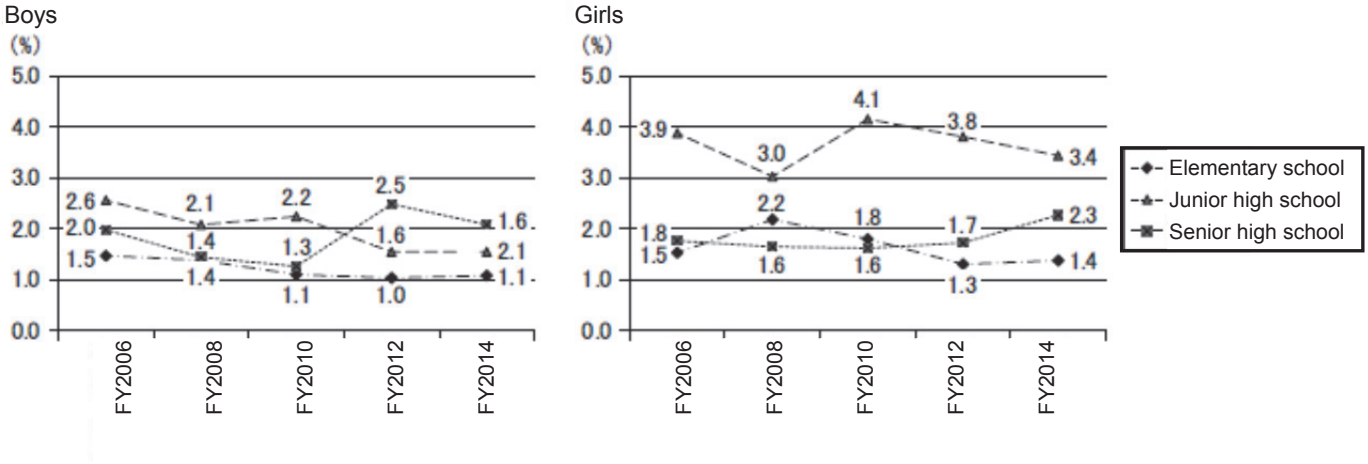

Figure 2 Annual change in the prevalence of thinness (total of thin and highly thin)

4.2 Annual change in hypertension

The figures below illustrate the annual change in the prevalence of hypertension and high-normal blood pressure for systolic blood pressure (Figs. 3 and 4) and diastolic blood pressure (Figs. 5 and 6). No major changes have been observed recently, but the prevalence of systolic hypertension and high-normal blood pressure continue to be higher in high school boys than in high school girls. The lower grades in elementary school were omitted from the examination of changes over time because the number of subjects was small.

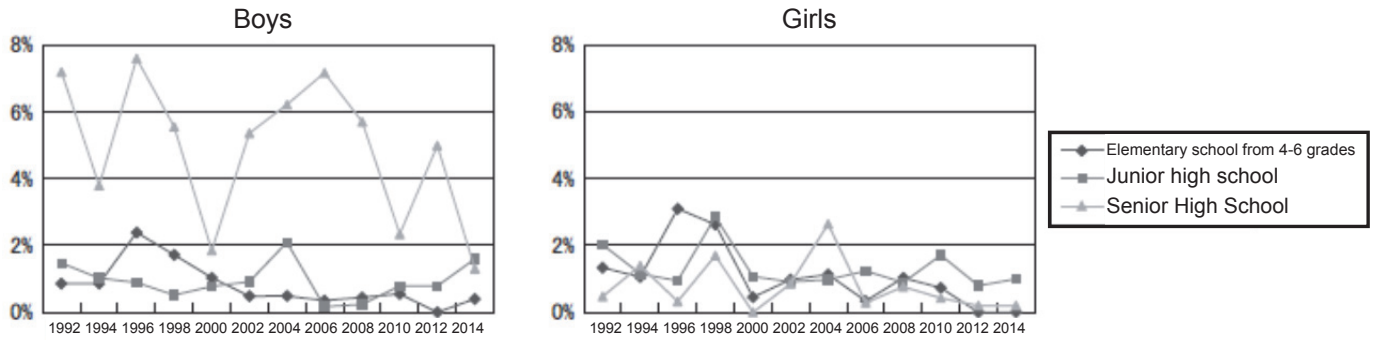

Figure 3 Prevalence of systolic hypertension (annual change)

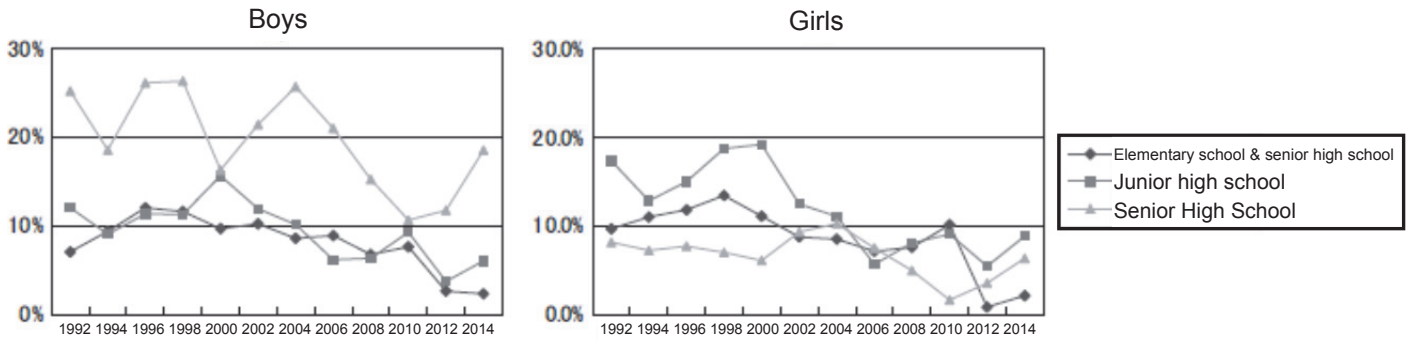

Figure 4 Prevalence of high-normal systolic blood pressure (annual change)

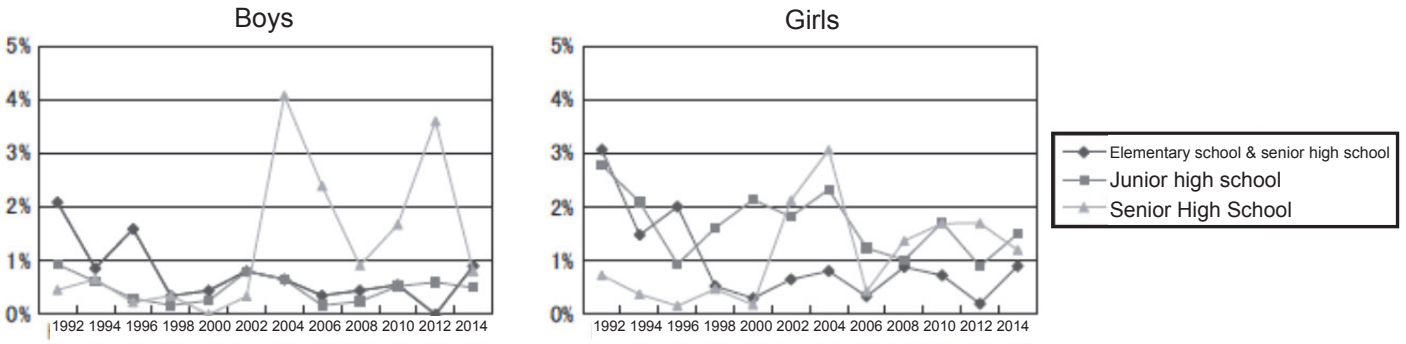

Figure 5 Prevalence of diastolic hypertension (annual change)

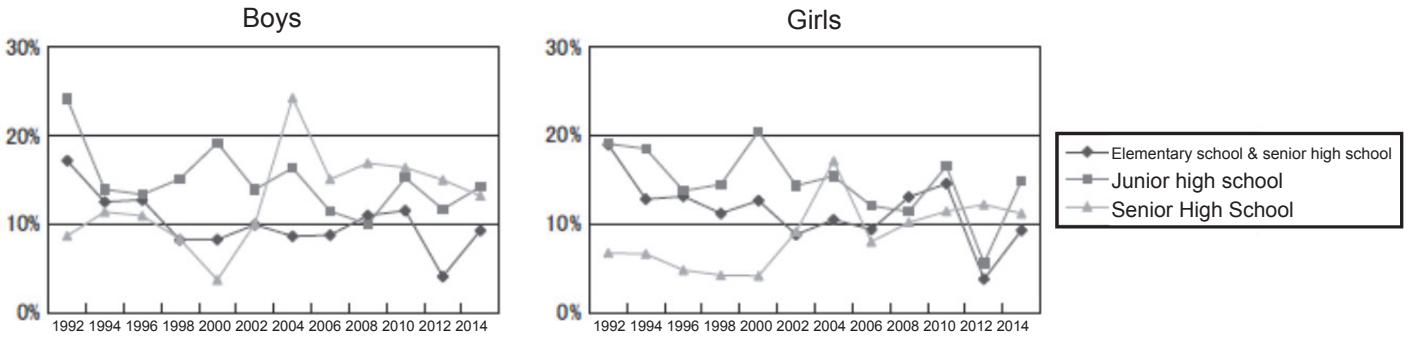

Figure 6 Prevalence of high-normal diastolic blood pressure (annual change)

4.3 Annual change in serum lipid levels (the frequency of scores in abnormal range or the border zone)

The figures below illustrates the changes over time in the prevalence of abnormal levels of total cholesterol and those in the border zone (Fig. 7) and the prevalence of abnormal levels of HDL cholesterol (Fig. 8).

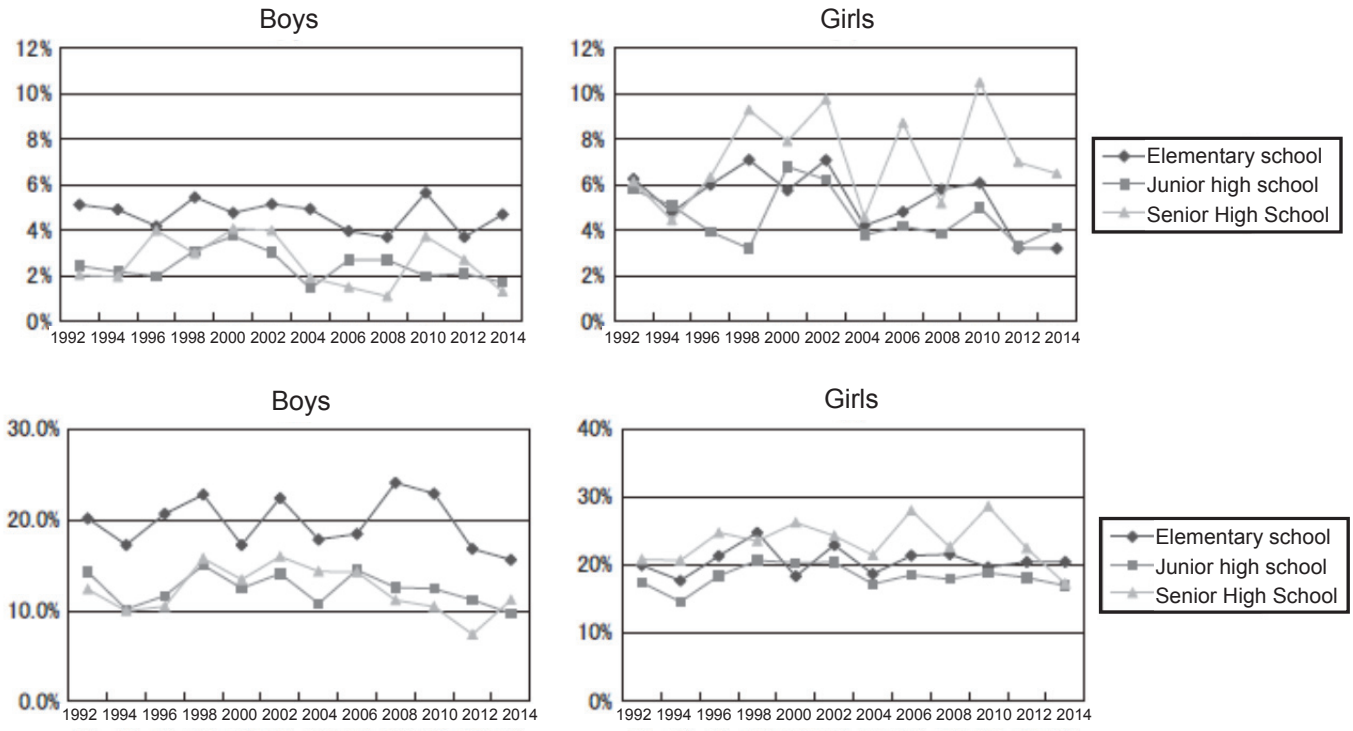

Figure 7 The frequency of observations of abnormal levels of total cholesterol (upper) and those in the border zone (lower) (annual change)

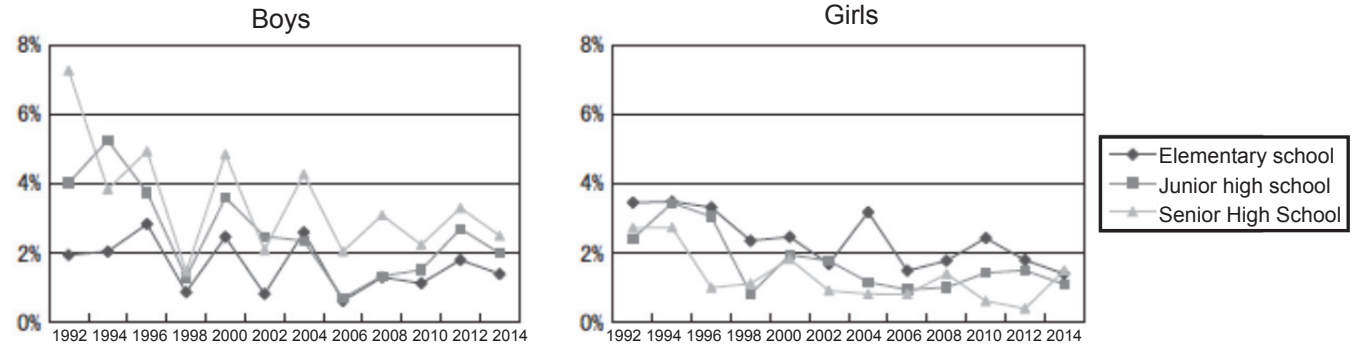

Figure 8 The frequency of observations of abnormal levels of HDL cholesterol (annual change)

5 Summary

1) Prevalence of obesity

The prevalence of obesity, as determined by the percentage of overweight, was the highest at age 11-12 for boys (13.4% at age 12) and age 15 for girls (10.3%) above any other ages in childhood or adolescence.

In terms of the prevalence of obesity among elementary and junior high school children, no change was observed when the FY2014 results were compared to the earlier results since FY2006. The increase in childhood obesity in Japan has stopped in recent years, and this result supports this understanding; however, it should be interpreted that "the prevalence of obesity remains high even today," considering that the childhood obesity prevalence was only about 3% in 1970. The FY2014 survey also revealed an increase of obesity among the senior high school boys and girls, which is a new trend.

2) Prevalence of thinness

The prevalence of thinness, as determined by the percentage of overweight , was the highest at age 11-15 for boys (2.4% at age 15) and age 12-15 for girls (4.3% at age 12) above any other ages in childhood or adolescence.

There were no major changes over time in terms of the prevalence of thinness, but this survey also showed that the girls' thinness, which was 3.4% in junior high school and 2.3% in senior high school, is generally higher than that of boys and that high school girls have are higher than elementary school girls.

As Japan being an exceptional country in the world for having a decreasing trend of BMI for young women, the trend of thinness among young women should be carefully monitored to prevent the birth of low birth weight infants.

3) Evaluation of abdominal obesity based on the measurement of waist circumference

When the criteria for an abnormal waist circumference is assumed to be 75cm or more for elementary school children and 80cm or more for junior high school students by applying the metabolic syndrome diagnosis criteria for children in Japan, 16.1% of the 5th and 6th grade boys, 10.6% of the 5th and 6th grade girls, 13.0% of junior high school boys, and 8.6% of junior high school girls were determined to have an abnormal waist circumference. Similarly, when the criteria for an abnormal waist circumference is assumed to half of his/her height or more, which is the reference point for intervention, 19.5% of the 5th and 6th grade boys, 10.6% of the 5th, and 6th grade girls, 12.9% of junior high school boys, and 12.2% of junior high school girls were determined to have an abnormal waist circumference.

Among all types of childhood obesity, increased visceral fat or abdominal obesity are considered to be the risk factors for developing atherosclerotic lesions as adults. Combined application of both the percentage of overweight calculated from height and weight and the waist circumference reflecting the level of abdominal visceral fat will better predict the risk of developing atherosclerotic lesions in the future with more accuracy. Although still limited to some of the survey schools that participated in the project this time, they were willing to adopt the waist circumference measurement; it complies with the purport of the School Health and Safety Act, which is to encourage the early intervention against obesity through the examination of children with abnormal waist circumference and the diagnosis of childhood metabolic syndrome.

4) Prevalence of hypertension

Previous reports suggest that the prevalence of childhood hypertension roughly 0.1-0.11%; this survey also showed similar values. Reportedly, about 3% of adolescence including senior high school children show high blood pressures; in this project, the prevalence of high blood pressures among high school boys are fluctuating between 1.3% and 7.2%. Many of the high school children with hypertension will likely turn into adulthood hypertension, so it would be important to encourage schools to adopt blood pressure monitoring as a part of school health activities.

The prevalence of systolic hypertension and high-normal blood pressure continues to be higher in high school boys than in high school girls. Considering that the prevalence of systolic blood pressure in high-normal range has risen to 18.6% from 11.8% in the last survey, any future changes should be carefully noted.

5) Prevalence of dyslipidemia

In order to evaluate dyslipidemia, a border zone between the normal and abnormal zones has been established for each serum lipid item, except for HDL cholesterol. The abnormal values observed that clearly indicate dyslipidemia are as follows. The prevalence of abnormal total cholesterol level was 4.7%, 1.7% and 1.3% of boys and in 3.2%, 4.1% and 6.5% of girls in elementary school, junior high school, and senior high school, respectively. The prevalence of abnormal LDL cholesterol level was 3.4%, 1.0% and 2.9% of boys and in 1.5%, 2.3% and 5.4% of girls in elementary school, junior high school, and senior high school, respectively. The prevalence of abnormal HDL cholesterol level was 1.4%, 2.0% and 2.5% of boys and in 1.4%, 1.1% and 1.5% of girls in elementary school, junior high school, and senior high school, respectively. The prevalences of these three dyslipidemia observed are similar to previously reported results, and the change over time was also minimal.

Although no notable annual changes was found, a universal screening of dyslipidemia may be important considering that there were few percents of childhood and adolescent dyslipidemia that require prompt intervention.

6) Relationship between physique and risk factors

Each subject was categorized as the thin, normal, or obese group using the percentage of overweight calculated from his/her height and weight, and risk factors on blood pressure and serum lipids were compared among the groups.

a) Collective analysis on all subjects

The obese group was compared to the normal group collectively for all subjects from elementary school to senior high school. The scores of the obese group were statistically significant in all seven risk factors namely, systolic blood pressure, diastolic blood pressures, average blood pressure, total cholesterol, HDL cholesterol, LDL cholesterol, and arteriosclerosis index (note: HDL cholesterol was significantly lower, others were higher).

b) Analysis by age group

The subjects were divided into 4age groups, grades 1-3, grades 4-6, junior high school, and senior high school, and the obese group was compared to the normal group within each age group. The systolic blood pressure, diastolic blood pressures, average blood pressure, HDL cholesterol, and arteriosclerosis index were statistically significant for the obese group across all age groups (HDL cholesterol was significantly lower, others were higher). The obese group tended to have higher LDL cholesterol across all age groups, but only age group that was statistically significant was that of the junior high school grades. The total cholesterol was significantly higher only for the obese group of the junior high school and senior high school groups.

c) Sub-analysis of normal physique group

The subjects who were determined to have normal weight were further divided into two groups by the percentage of overweight (+15% and more) and risk factors of each group were compared by age group (grades 1-3, grades 4-6, junior high school grades, and senior high school grades) in a similar fashion.

In the group with +15% or greater in the percentage of overweight, the arteriosclerosis index was high across all age groups; in particular, grades 4-6, junior high school, and senior high school groups showed a statistical significance. This difference was associated with the significantly low levels of HDL cholesterol found in grades 1-3, grades 4-6, and junior high school groups.

This analysis revealed that in a child without obesity but with lightly accumulated fat, his/her blood pressure and lipid levels have changed having to take notice.

d) Children with risk factors for lifestyle-related disease can be detected early if the relationship between the indicators of obesity or thinness, and other risk factors can be clarified.

Chapter 5 Overview of Survey Results on Life Style

In order to evaluate the health status of school children, it is important to clarify the lifestyle of children, i.e., their daily patterns of sleep, exercise, and diet at home as well as their school life. Therefore, this chapter is devoted to describe the daily activities including physical activities both at home and school.

1 Bedtime (of the night before the survey day)

When the average bedtime was compared by school age, it was 21:21 (hh:mm) and 21:20 for boys and girls of grades 1-2, 21:36 and 21:39 for grades 3-4 boys and girls, 21:55 and 22:03 for grades 5-6 boys and girls, 23:12 and 23:21 for junior high school boys and girls, and 23:50 and 23:53 for senior high school boys and girls, respectively. The bedtime tends to be later in higher grades.

In terms of the gender and school ages, the bedtime for boys and girls of grades 1-2, grades 3-4, and senior high school grades were about the same, but the bedtime for girls was later than that of boys in grades 5-6 and junior high school ages.

When compared to a previous study, namely the FY1981 survey, the bedtime has become later by 15 minutes and 23 minutes for grades 3-4 boys and girls, 9 minutes and 15 minutes for grades 5-6 boys and girls, and 29 minutes and 28 minutes for junior high school boys and girls, respectively.

When compared to the FY2004 survey, the bedtime has become earlier by 14 minutes and 7 minutes for grades 1-2 boys and girls, 14 minutes and 9 minutes for grades 3-4 boys and girls, 3 minutes and 5 minutes for grades 5-6 boys and girls, and 16 minutes and 13 minutes for senior high school boys and girls, respectively, and 3 minutes for junior high school girls. The bedtime of junior high school boys was the same.

Moreover, when compared to the 2012 survey, the bedtime is about the same for both boys and girls in elementary school but became 3 minutes and 6 minutes early for boys and girls in junior school, respectively, and 9 minutes earlier for both boys and girls of senior high school.

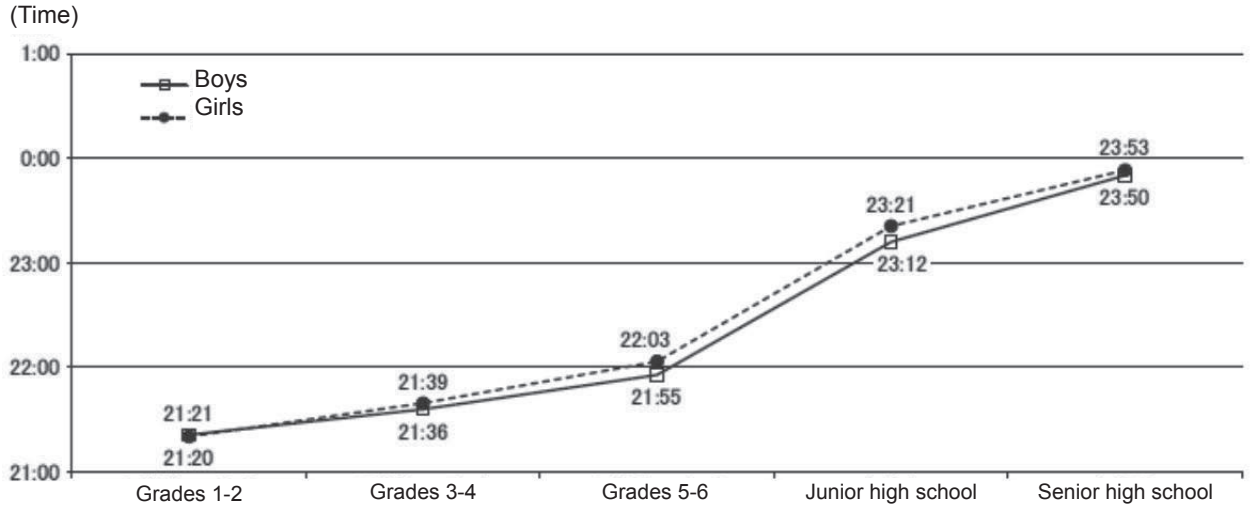

Figure 5-1-1 Average bedtime (of the night before the survey day)

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In order to evaluate the health status of school children, it is important to clarify the lifestyle of children, i.e., their daily patterns of sleep, exercise, and diet at home as well as their school life. Therefore, this chapter is devoted to describe the daily activities including physical activities both at home and school.

* The FY1981 values were extracted from the *FY1981 School Children and Students Health Status Survey* (by JSSH).For the purpose of comparison, the weighted averages of Grades 3 and 4 and Grades 5 and 6 from the FY1981 survey were used as the adjusted values for the Grades 3-4 and 5-6, respectively.

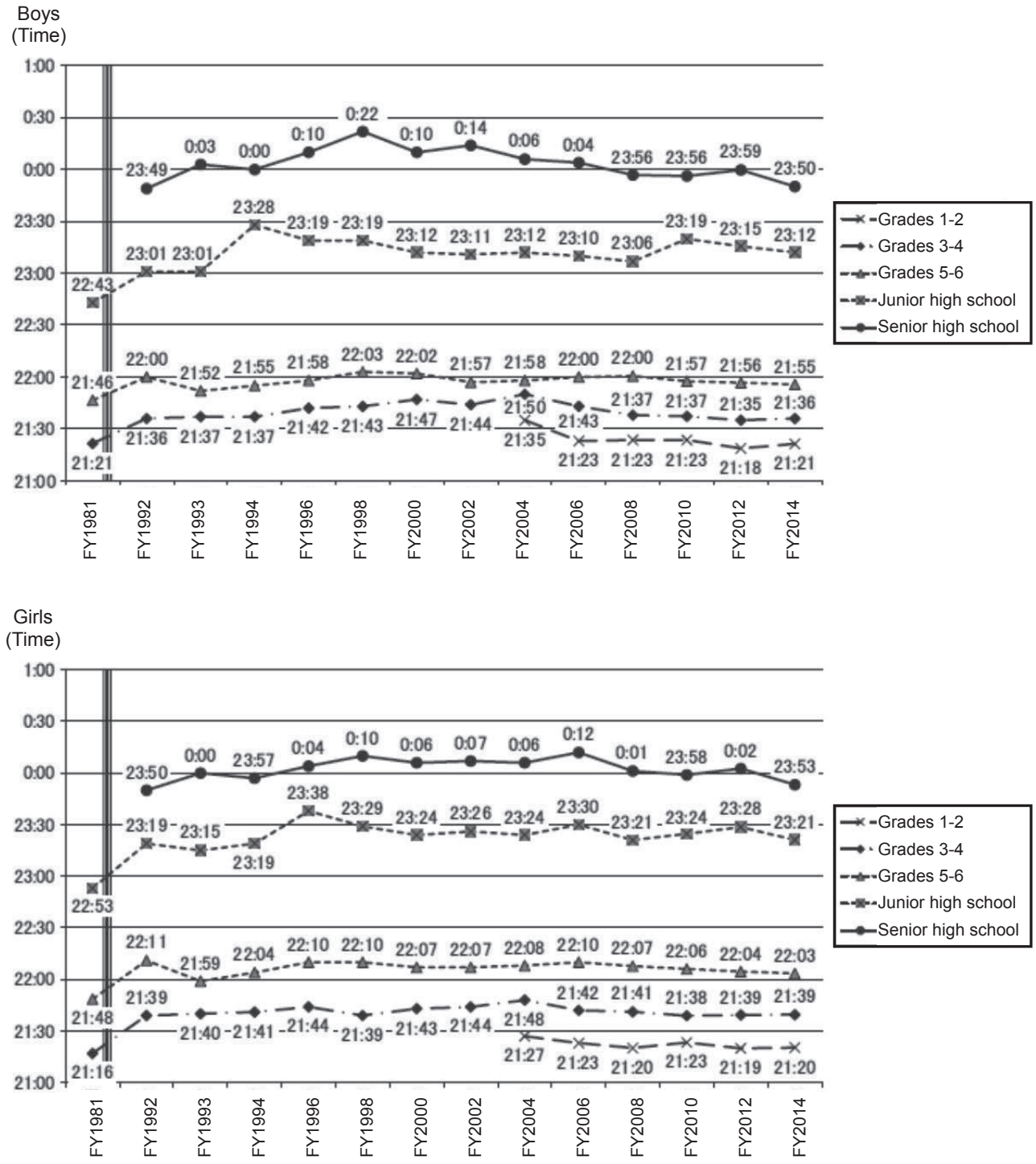


Figure 5-1-2 Annual change of average bedtime (of the night before the survey day)

2 Wake-up time (on the survey date)

When the average time to wake up was compared by school age, it was 6:35 for both boys and girls of grades 1-2, 6:36 and 6:35 for grades 3-4 boys and girls, 6:39 for both grades 5-6 boys and girls, 6:37 and 6:32 for junior high school boys and girls, and 6:38 and 6:32 for senior high school boys and girls. Both boys and girls in elementary school wake up at about same time, but girls wake up earlier than boys in junior and senior high schools.

When compared to the previous survey from FY2004, boys and girls are waking up earlier by 5 minutes and 3 minutes for grades 3-4, 10 minutes and 9 minutes for grades 5-6, 10 minutes and 7 minutes for junior high school students, and 8 minutes and 2 minutes for senior high school students, respectively.

When compared to the FY2012 survey, boys in both junior and senior high school students, junior high school girls, and senior high school girls are waking up 2, 3, and 5 minutes later, respectively.

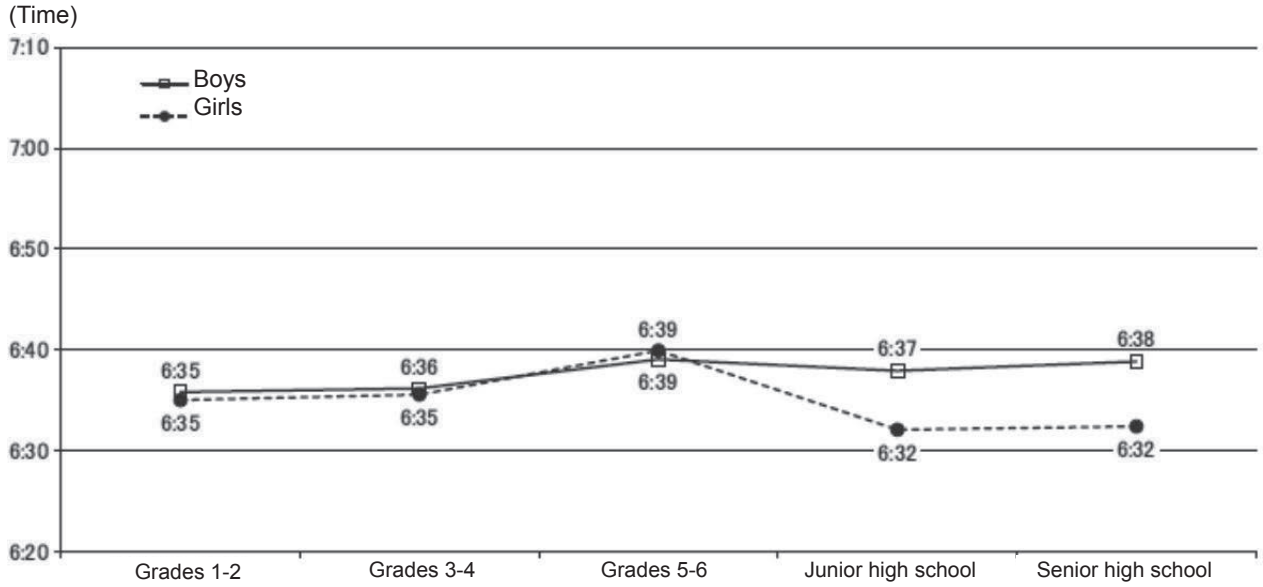


Figure 5-2 Average wake-up time of the survey day

3 Hours of sleep

The average hours of sleep by school age was 9:14 for both boys and girls of grades 1-2, 9:00 and 8:56 for grades 3-4 boys and girls, 8:43 and 8:36 for grades 5-6 boys and girls, 7:25 and 7:10 for junior high school boys and girls, and 6:48 and 6:38 for senior high school boys and girls. The hours of sleep tends to be shorter in higher grades. In terms of gender, there was no difference between boys and girls in grades 1-2. The hours of sleep from grades 3-4 up to senior high school were shorter in boys than in girls, specifically by 15 minutes in junior high school and 10 minutes in senior high school.

When compared to previous studies, namely the FY1981 survey, the hours of sleep have become shorter by 45 minutes and 42 minutes for grades 3-4 boys and girls, 13 minutes and 19 minutes for grades 5-6 boys and girls, and 20 minutes and 30 minutes for junior high school boys and girls, respectively.

When compared to the FY2004 survey, the hours of sleep have become shorter by 5 minutes and 10 minutes for grades 1-4 boys and girls, 8 minutes and 4 minutes for grades 5-6 boys and girls, and 10 minutes and 5 minutes for junior high school boys and girls, respectively. It has become longer by 9 minutes and 5 minutes for grades 3-4 boys and girls, and 9 minutes and 11 minutes for senior high school boys and girls, respectively.

Moreover, when compared to the FY2012 survey, the hours of sleep are about the same for both boys and girls in elementary school but became 6 minutes and 9 minutes longer for boys and girls in junior school and 12 minutes and 15 minutes longer for senior high school boys and girls, respectively.

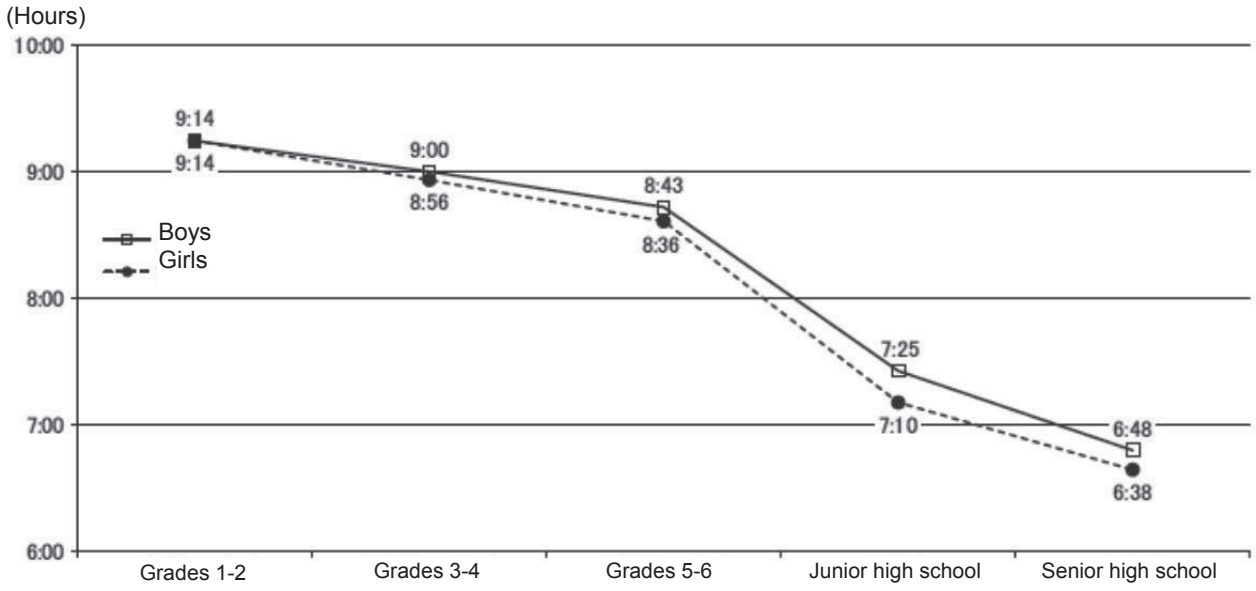


Figure 5-3-1 Average hours of sleep

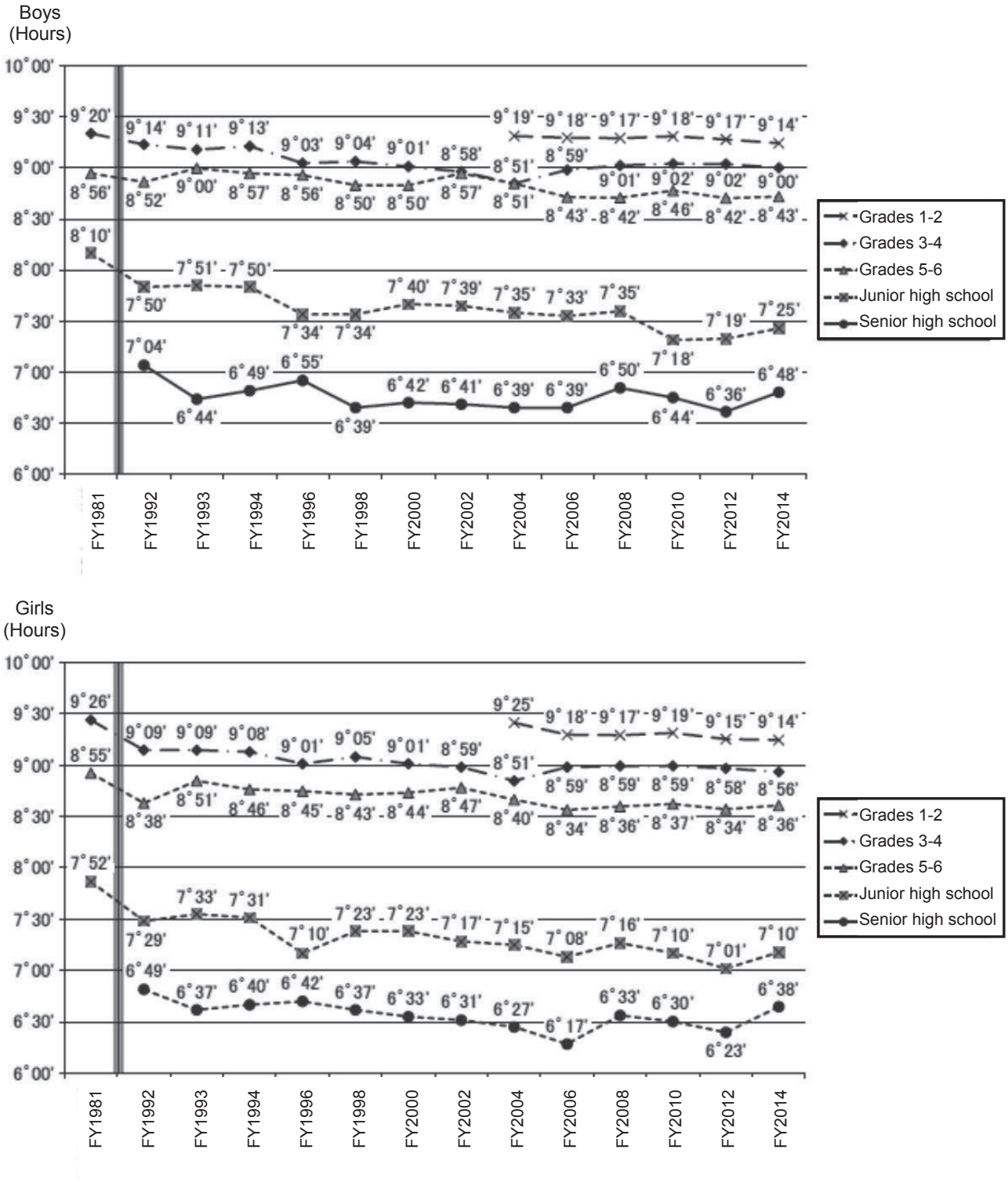


Figure 5-3-2 Annual change of average hours of sleep

4 Status on the ease of falling asleep

When school children and students were asked about the ease of falling asleep, 81.7% of boys and 79.3% of girls answered that “I fell asleep quickly,” 12.7% of boys and 15.2% of girls answered that “I had trouble falling asleep,” and 5.7% of boys and 5.5% of girls answered that “I do not remember well.”

When compared by school age and gender, the number of those who answered “I fell asleep quickly” decreases from junior high school ages and after in both boys and girls. Moreover, the proportion is further lower in girls than in boys when compared by gender. On the other hand, the number of boys who answered “I had trouble falling asleep” increases as the school age advances among elementary school children and junior high school students. For girls, the number continues to grow with grades. The proportions were always higher in girls than in boys across all school ages.

When compared to the FY2012 survey, the school children and students who answered that “I had trouble falling asleep” have slightly increased overall.

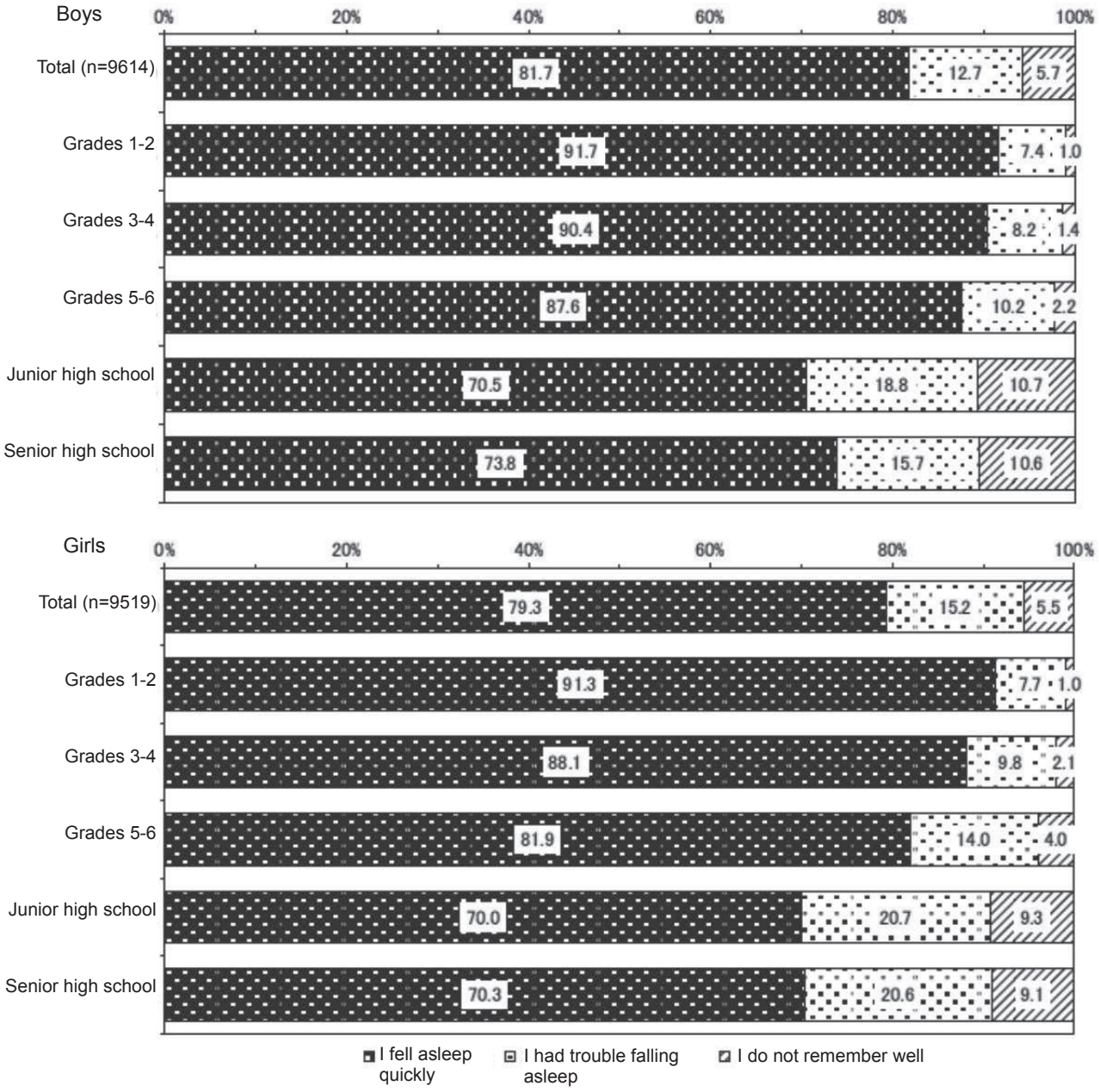


Figure 5-4 Status of ease of falling asleep

5 Status on the ease of waking up

When school children and students were asked about the ease of waking up, 29.3% of boys and 23.9% of girls answered that "I woke up refreshed," 53.3% of boys and 56.2% of girls answered that "I was still sleepy a little," and 17.4% of boys and 19.9% of girls answered that "I was sleepy and had trouble waking up."

When compared by school ages and gender, the answer "I woke up refreshed" tended to decrease as the grade advanced. Moreover, the proportion is further lower in girls than in boys when compared by gender. On the other hand, the number of boys who answered "I was sleepy and had trouble waking up" increases as the school age advances from grades 5-6 up to senior high school. Additionally, the proportions were always higher in girls than in boys across all school ages.

When compared to the FY2012 survey, the answer "I woke up refreshed" decreased in all school ages.

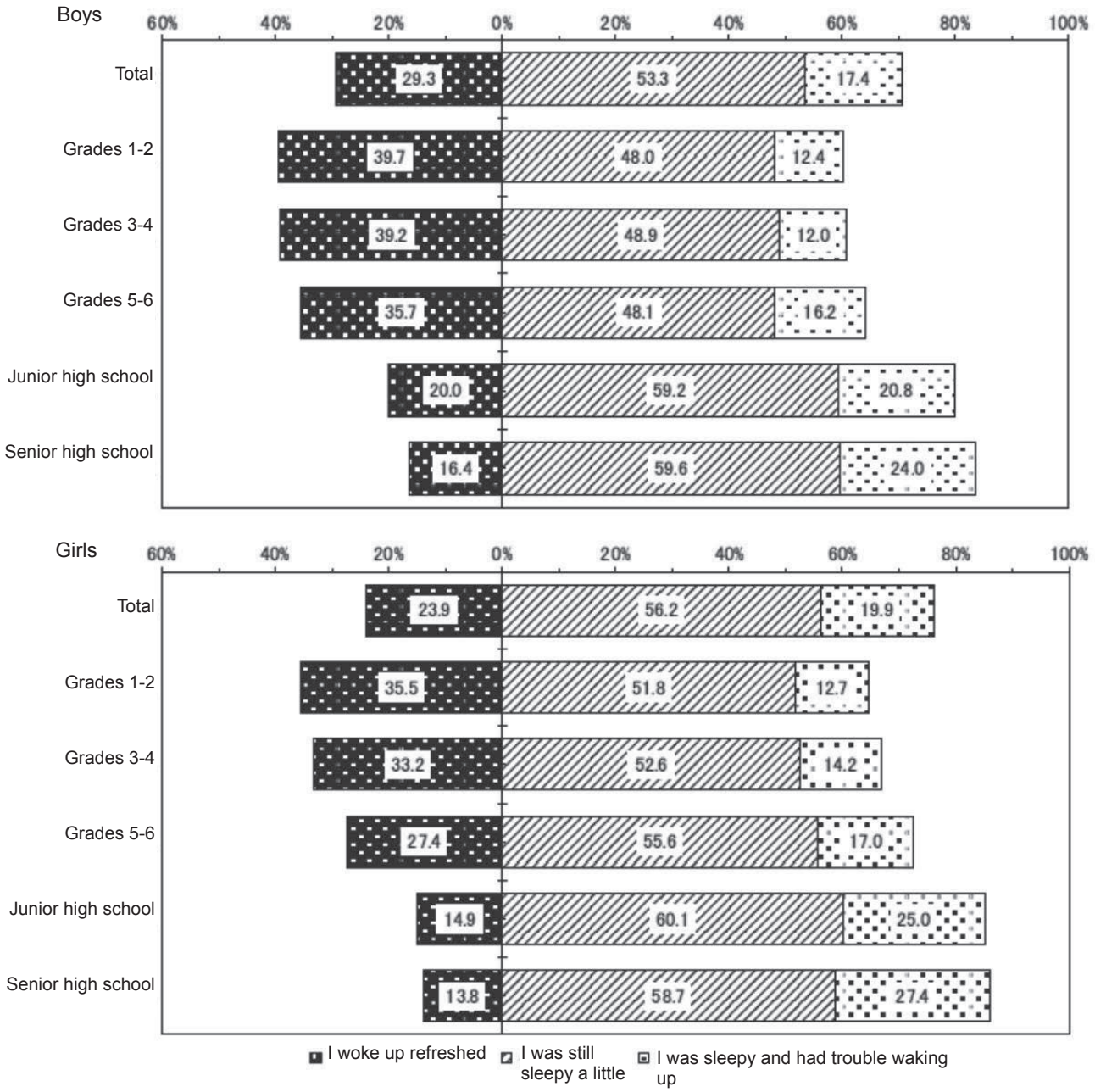


Figure 5-5-1 Status on the ease of waking up

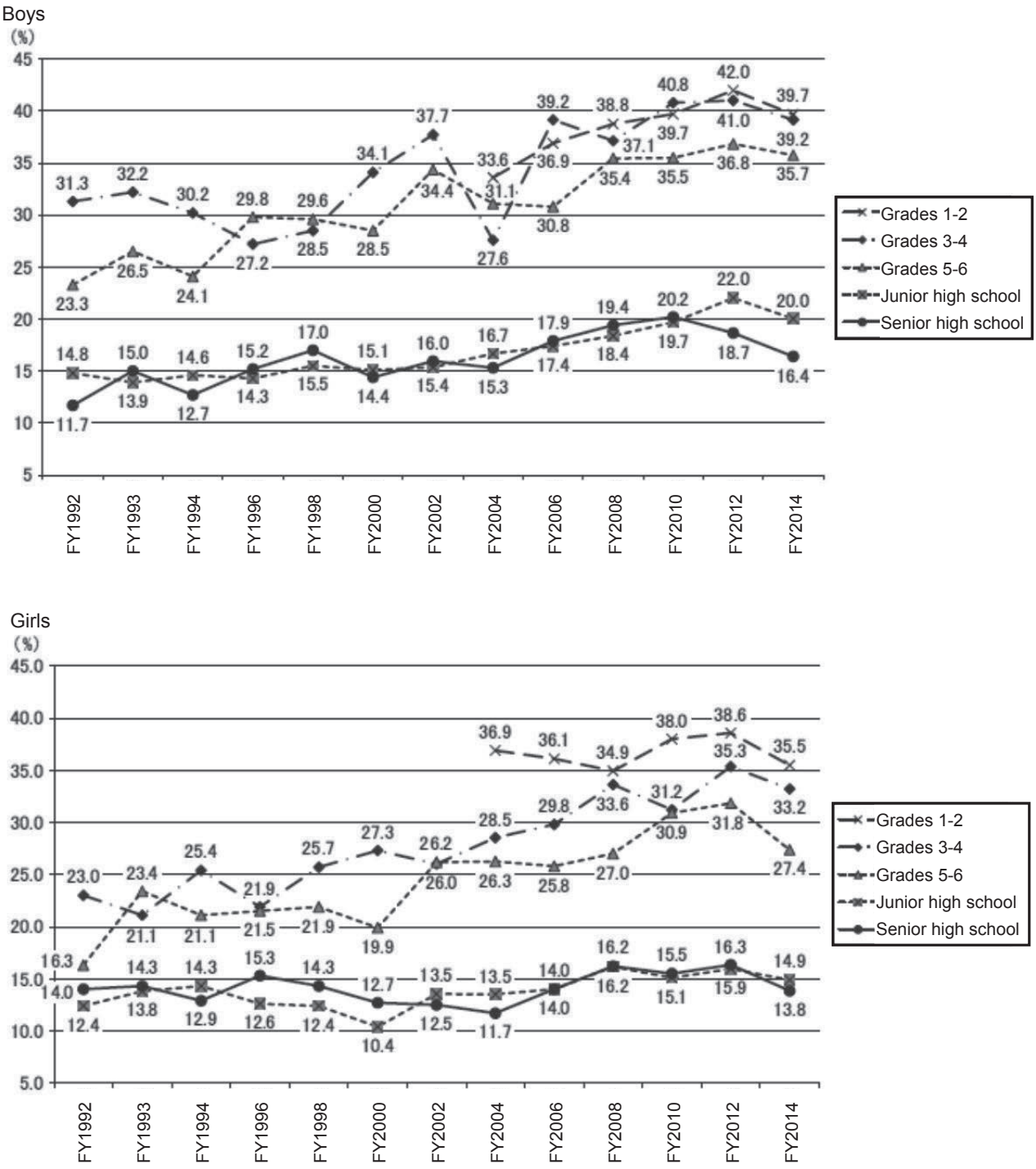


Figure 5-5-2 Annual change of the proportion who answered "I woke up refreshed" on the survey day

6 Sleep shortage

6.1 Status on lack of sleep

The answer “Lately I feel a lack of sleep” occupied 34.4% in boys and 41.2% in girls, overall.

When compared by school age and gender, the tendency of “Lately I feel a lack of sleep” grows higher as the school age advances. In terms of gender, the proportion of the school children and students who answered “Lately I feel a lack of sleep” was always higher in girls than in boys across all school ages. Across all school ages more girls felt the lack of sleep compared to boys, and the proportion difference between boys and girls was 0.6% for grades 1-2, 1.0% for grades 3-4, 7.6% for grades 5-6, 12.2% in junior high school, and 8.4% in senior high school.

Compared to the FY2012 survey, the answer “Lately I feel a lack of sleep” increased by 0.3% in boys and 0.7% for girls, overall.

Of those who do not feel the lack of sleep, 68.5% answered that “I fell asleep quickly” and 31.5% answered that “I had trouble falling asleep.” On the other hand, of those who feel the lack of sleep, 41.1% answered that “I fell asleep quickly” and 58.9% answered that “I had trouble falling asleep.”

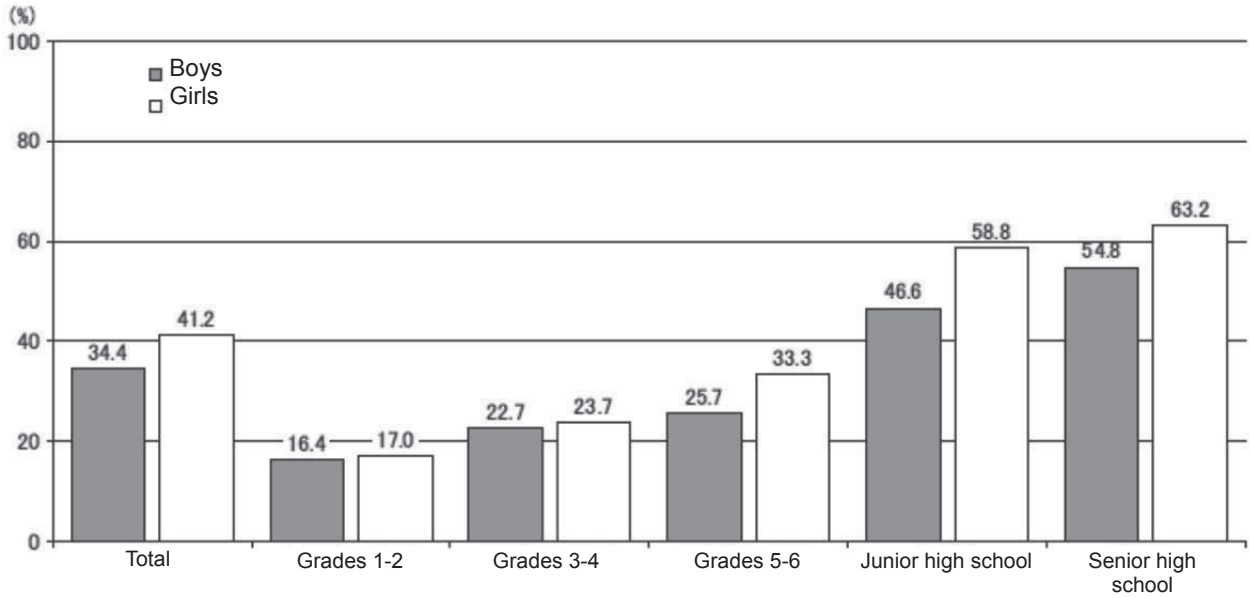


Figure 5-6-1 Ratios of those who feel the lack of sleep

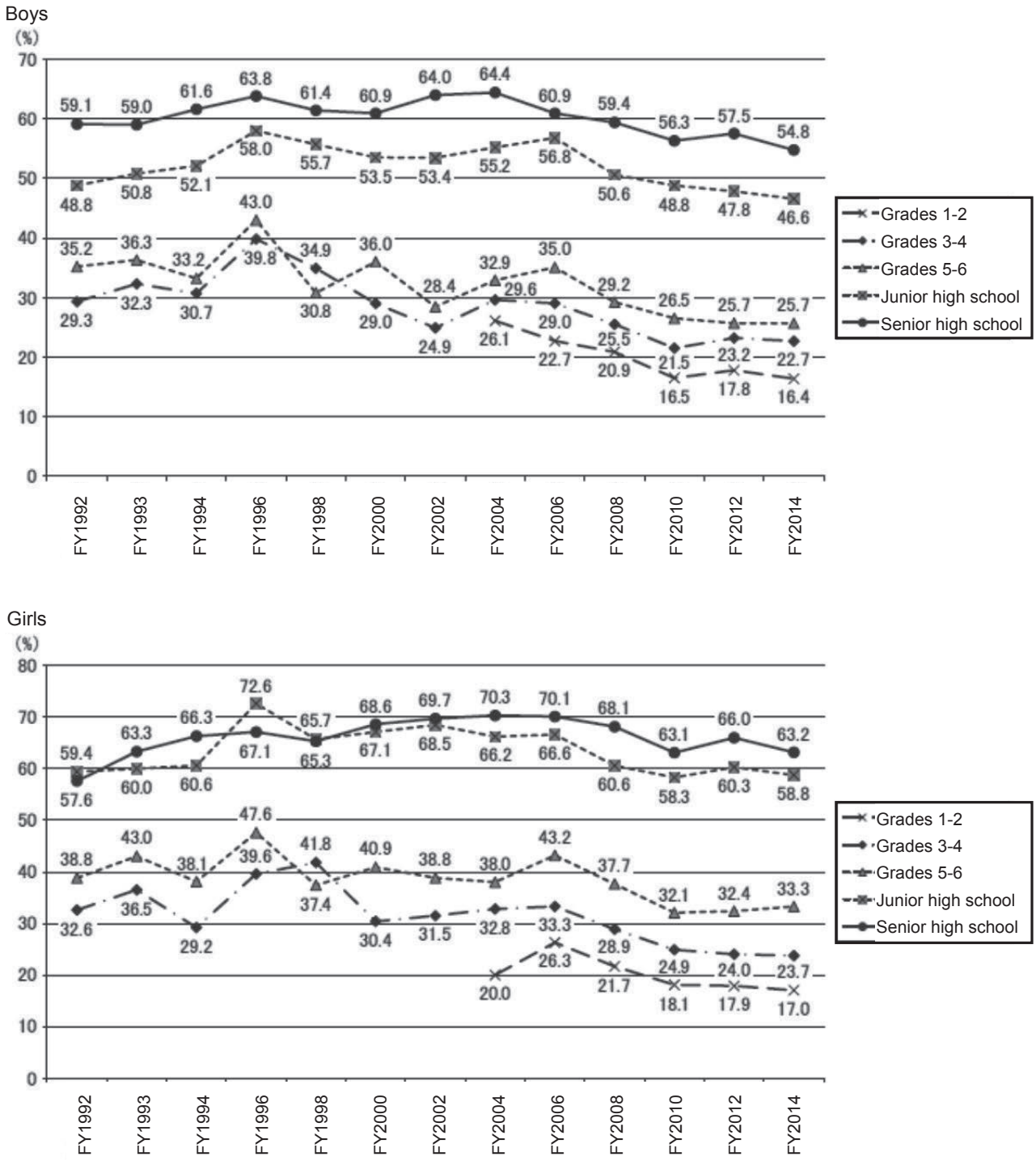


Figure 5-6-2 Annual change of ratios of those who feel the lack of sleep

6.2 Reasons to feel the lack of sleep (multiple answers)

(Only those who answered "I feel so" in the previous question on the lack of sleep answered this question.)

When children are asked about the cause of lack of sleep, the most frequent answer in both boys and girls was "Somehow I stay up late" with 45.1% overall; ranked in the second was "I am watching a television, DVD, or video on the Internet" at 33.7% in boys and "I stay up late doing assignments and homework" at 40.7% in girls; the third was "I stay up late doing assignments and homework" at 31.6% in boys and "I am watching a television, DVD, or video on the Internet" at 30.7% in girls; and the forth was "I am playing games" at 28.7% in boys and "I am engaged in social exchanges with someone using my mobile phone, smartphones, e-mails, etc." at 20.1% in girls.

When compared by school age and gender, the most common answer for both boys and girls in grades 1-2 was "My bedtime becomes later because everyone in my family goes to sleep late at night," occupying 30.8% in boys and 33.3% in girls. "Somehow I stay up late" was ranked in the second at 27.0% in boys and 26.2% in girls, and "I am watching a television, DVD, or video on the Internet" was raked in the third at 19.8% in boys and 25.7% in girls.

For grades 3-4 children, the most frequent answer was "Somehow I stay up late" at 34.5% in boys and 34.7% in girls; ranked in the second was "My bedtime becomes later because everyone in my family goes to sleep late at night" at 33.4% in boys and 31.3% in girls; the third in boys was "I am watching a television, DVD, or video on the Internet" at 32.5% and the third in girls was "I stay up late doing assignments and homework" at 28.8%.

For grades 5-6 children, the most frequent answer was "Somehow I stay up late" at 36.1% in boys and 41.9% in girls; ranked in the second was "I am watching a television, DVD, or video on the Internet" in boys at 34.0% and "I stay up late doing assignments and homework" in girls at 33.6%; the third was "I am playing games" in boys at 32.2% and "I am watching a television, DVD, or video on the Internet" in girls at 32.4%.

For junior high school students, the most frequent answer was "Somehow I stay up late" at 49.1% in boys and "I stay up late doing assignments and homework" at 54.9% in girls; ranked in the second was "I stay up late doing assignments and homework" in boys at 40.2% and "Somehow I stay up late" in girls at 48.1%; the third was "I am watching a television, DVD, or video on the Internet" for both boys and girls at 38.2% and 35.8%, respectively.

For senior high school students, the most frequent answer was "Somehow I stay up late" at 54.2% in boys and 51.2% in girls; ranked in the second was "I am watching a television, DVD, or video on the Internet" in boys at 32.2% and "I am engaged in social exchanges with someone using my mobile phone, smartphones, e-mails, etc." in girls at 35.9%; the third was "I stay up late doing assignments and homework" for both boys and girls at 29.5% and 35.4%, respectively.

The family life is affecting the elementary school children. For junior and senior high school students, both boys and girls are affected by the social exchange with someone using mobile phones, smartphones and e-mails. When compared to the last survey, there is an increasing trend of influence from watching a television, DVD, and online videos as well as playing games.

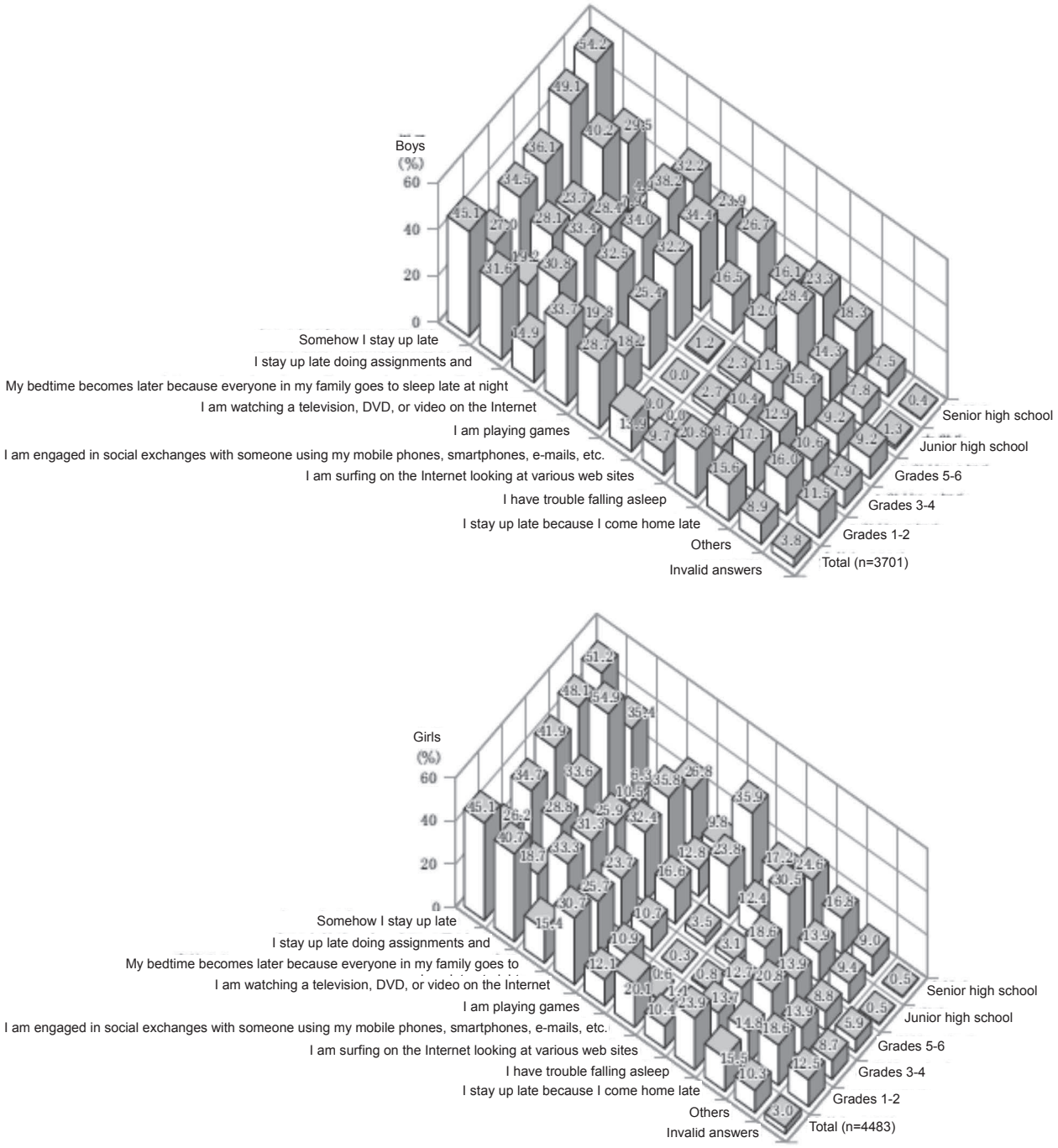


Figure 5-6-3 Reasons to feel the lack of sleep (multiple answers)
(Only those who answered “I feel so” in the previous question on the lack of sleep answered this question.)

6.3 Results including the cross tabulation

The following items were statistically significant in the cross-analysis between lack of sleep and lifestyle ($p<0.05$).

Lack of sleep and the time spent on a mobile phone or smartphone

Of those who answered that "Lately I feel a lack of sleep," those who answered "I regularly use a mobile phone or smartphone outside of school" were using such device for 1:51 in boys and 1:57 in girls on overage, overall. On the other hand, of those who answered that "Lately I do not feel a lack of sleep," those who answered "I regularly use a mobile phone or smartphone outside of school" were using such device for 1:19 in boys and 1:16 in girls on overage, overall.

Additionally, of those who answered that "Lately I feel a lack of sleep," those who answered "I regularly use a mobile phone or smartphone outside of school" were using such device on average for 2:02 in junior high school boys, 2:05 in junior high school girls, 2:15 in senior high school boys, and 2:30 in senior high school girls. Of those who answered "I regularly use a mobile phone or smartphone outside of school," those who answered "Lately I feel a lack of sleep" are using a mobile phone or smartphone 36 minutes longer on average than those who answered "Lately I do not feel a lack of sleep."

Lack of sleep and exercise

When those who do not feel a lack of sleep are compared to those who do, grades 1-2 boys, grade 1-2 girls, grade 3-4 boys, grades 5-6 boys, grades 5-6 girls, and junior high school boys spend 35, 29, 16, 44, 5, and 21 minutes longer in exercise, respectively. For grades 3-4 girls, junior high school girls, and senior high school boys and girls, the exercise time is 6, 15, 26, and 25 minutes shorter.

For both boys and girls, the proportions of those who participate in extracurricular activities and sport clubs and those who participate exercise other than extracurricular activities and sport clubs tend to be higher among those who do not feel a lack of sleep than those who do.

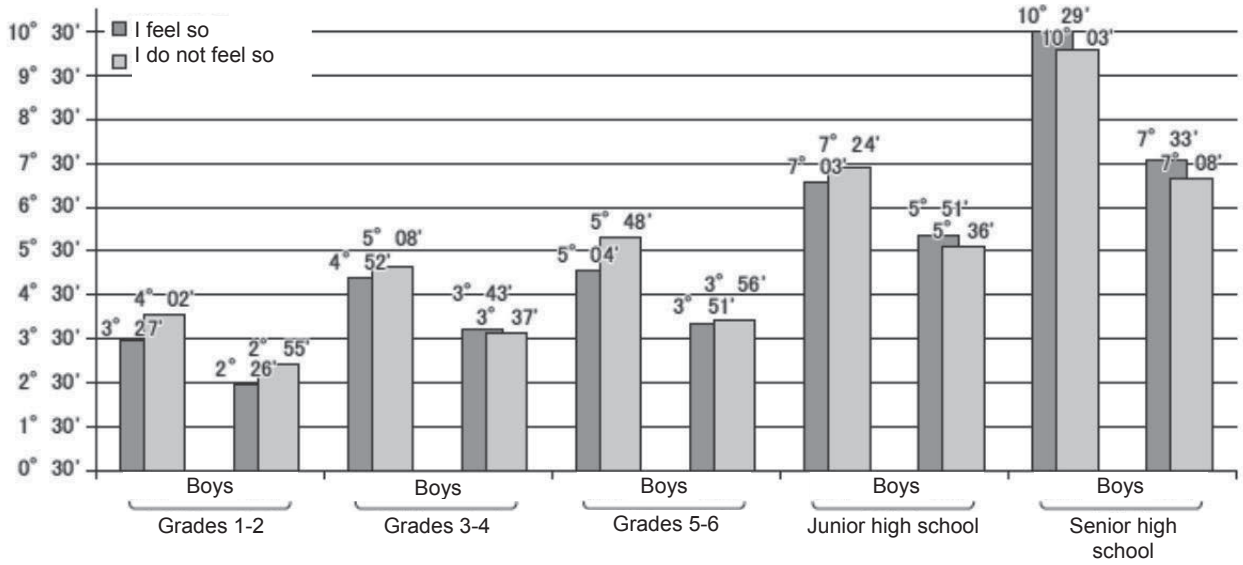


Figure 5-6-4 Status on lack of sleep and exercise time

Figure 5-6-5 The proportions of those who participate in extracurricular activities or sports clubs among those who feel a lack of sleep

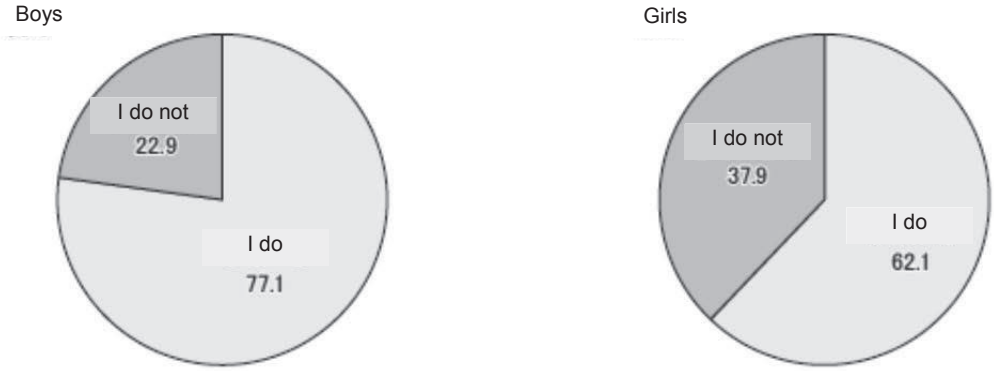


Figure 5-6-6 The proportions of those who participate in extracurricular activities or sports clubs among those who do not feel a lack of sleep

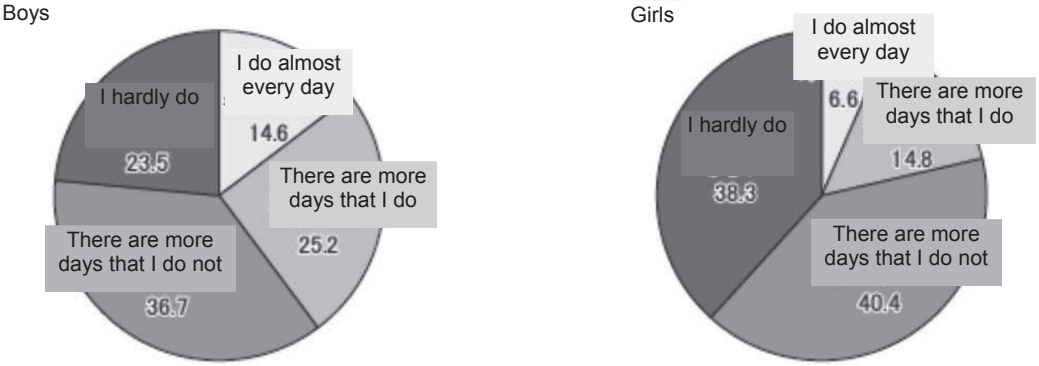


Figure 5-6-7 The proportions of those who participate in exercise other than extracurricular activities or sports clubs among those who feel a lack of sleep

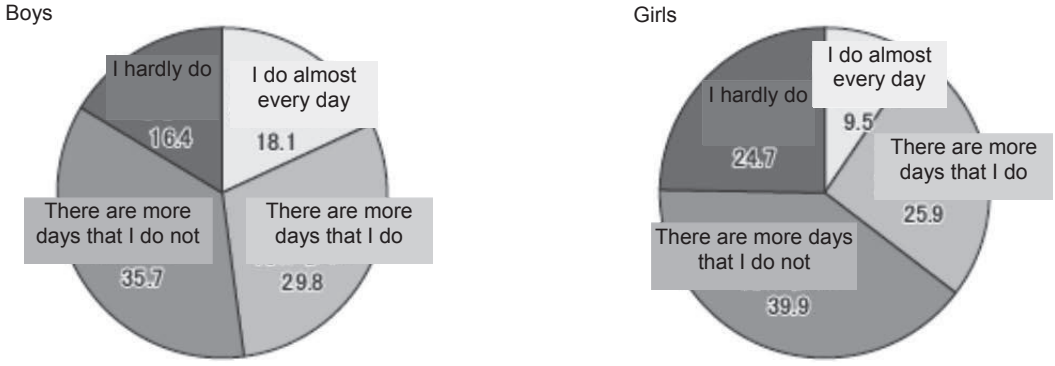


Figure 5-6-8 The proportions of those who participate in exercise other than extracurricular activities or sports clubs among those who do not feel a lack of sleep

7 Leaving time for school and the duration at home after waking up till going to school

The time to leave home to go to school were about the same for boys and girls on average at 07:30 and 07:29, respectively.

The average duration at home after waking up till going to school was 55 minutes in boys and 57 minutes in girls. In terms of school age, it takes 54-55 minutes for elementary and junior high school boys, 57 minutes for senior high school boys, 54-56 minutes for elementary school girls, 58 minutes for junior high school girls, and 63 minutes for senior high school girls.

7.1 Relationship between the duration at home after waking up till going to school and lifestyle

When compared by the sense of lack of sleep, the average duration at home after waking up till going to school tended to be 2-7 minutes shorter for those who feel a lack of sleep than those who do not across all school ages.

When compared by the pattern of bowel movement, the average duration at home after waking up till going to school tended to be up to 9 minutes longer for those who answered that “I have a daily bowel movement about the same time a day” than those who answered otherwise.

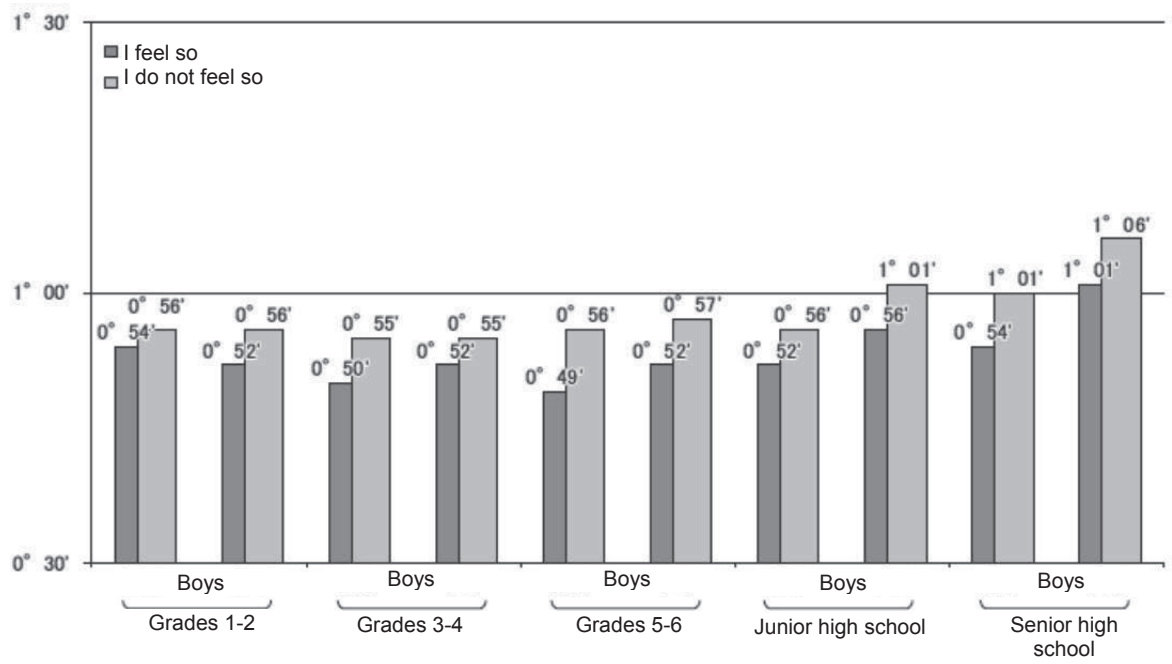


Figure 5-7-1 Average duration at home after waking up till going to school when compared by the sense of lack of sleep

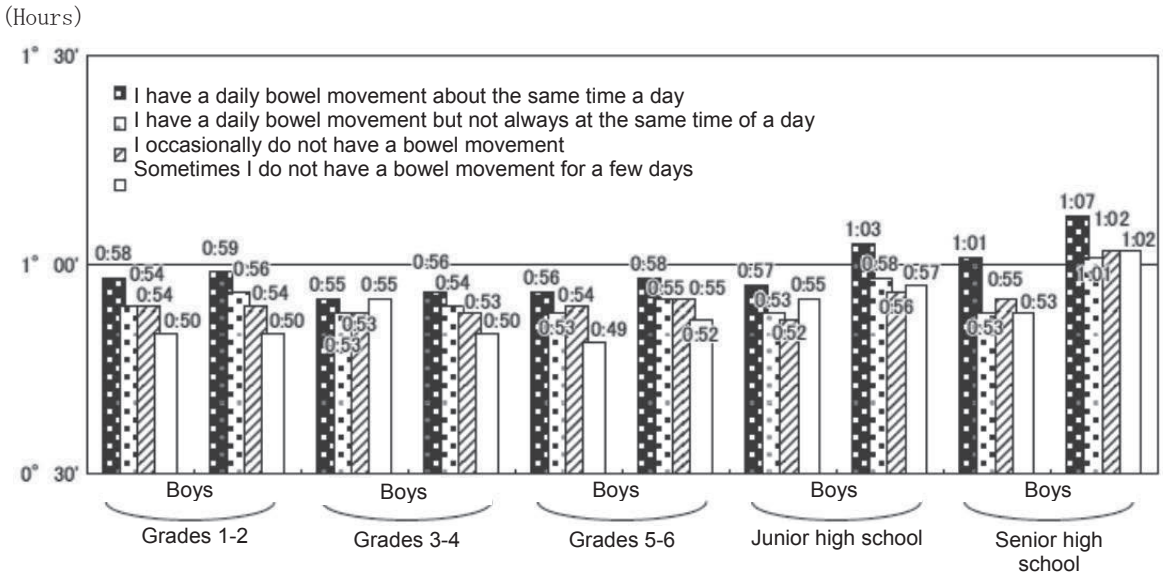


Figure 5-7-2 Average duration at home after waking up till going to school when compared by the pattern of bowel movemen

The duration at home after waking up till going to school in terms of having or not having a breakfast, those who often skip breakfast and those who hardly have breakfast tended to be shorter than those who have breakfast everyday in both boys and girls across all school ages, namely by 20-29 minutes in boys and 6-18 minutes in girls.

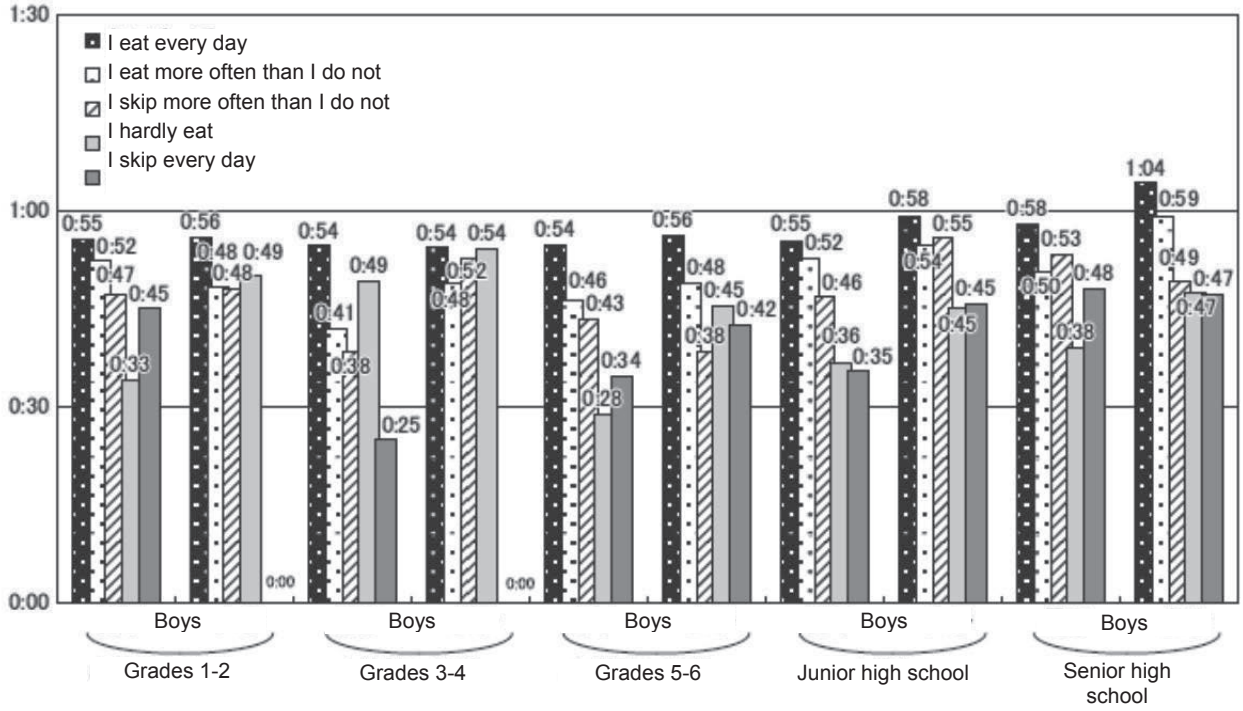


Figure 5-7-3 Average duration at home after waking up till going to school when compared by the breakfast patterns

7.2 Commute time

The average time to commute to school was 18-20 minutes for elementary school children and 18-19 minutes for junior high school students. It was 33-35 minutes for senior high school students.

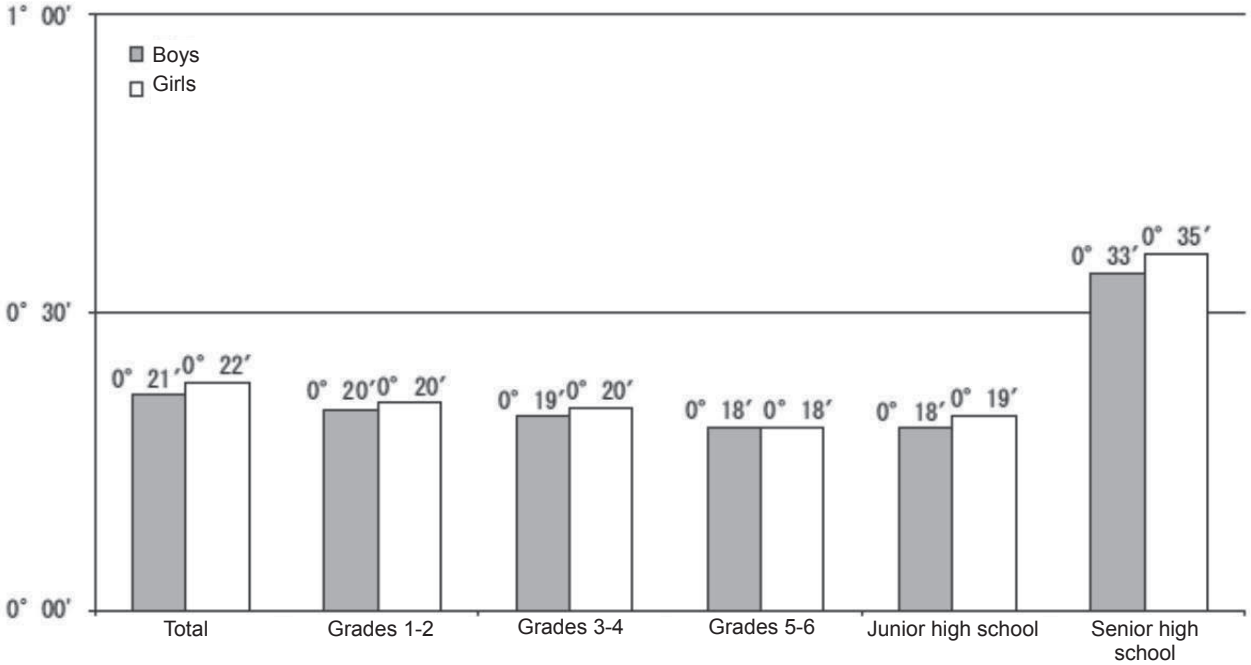


Figure 5-7-4 Average commute time to school

8 Deficient habit

In terms of regular bowel movement, 69.4% of boys and 51.6% of girls have a daily bowel movement, by answering either “I have a daily bowel movement about the same time a day” or “I have a daily bowel movement but not always at the same time of a day.”

When compared by school age and gender, the “I have a daily bowel movement” group occupied 54.0% of boys and 56.3% of girls at grades 1-2, 65.9% of boys and 60.1% of girls at grades 3-4, 70.2% of boys and 55.4% of girls at grades 5-6, 70.8% of boys and 47.4% of girls at junior high school, and 75.4% of boys and 41.2% of girls at senior high school. The proportion of “I have a daily bowel movement” is lower in girls than in boys across all school ages. Particularly, boys with a daily bowel movement exceeds 70% in grades 5-6 and after -- as high as 75% in high school; however, the proportions are lower among girls at 55-60% in elementary school and at a level of 40% in junior and senior high schools. In addition, one of 5 to 8 girls junior and senior high school answered that “Sometimes I do not have a bowel movement for a few days.” Of these, those who answered “I skip more often than I do not,” “I hardly eat,” or “I skip every day ” for a breakfast occupy 10.2% and 6.2% in grades 5-6, 13.8% and 7.0% in junior high school, and 22.9% and 10.9% in senior high school boys and girls, respectively (with statistical significance).

Moreover, when compared by the body shape (thin, normal, or obese), more children answered that “I sometimes do not have a bowel movement for several days” among the thin group in grades 1-2 boys and girls, grades 3-4 girls, and high school boys and girls (with statistical significance).

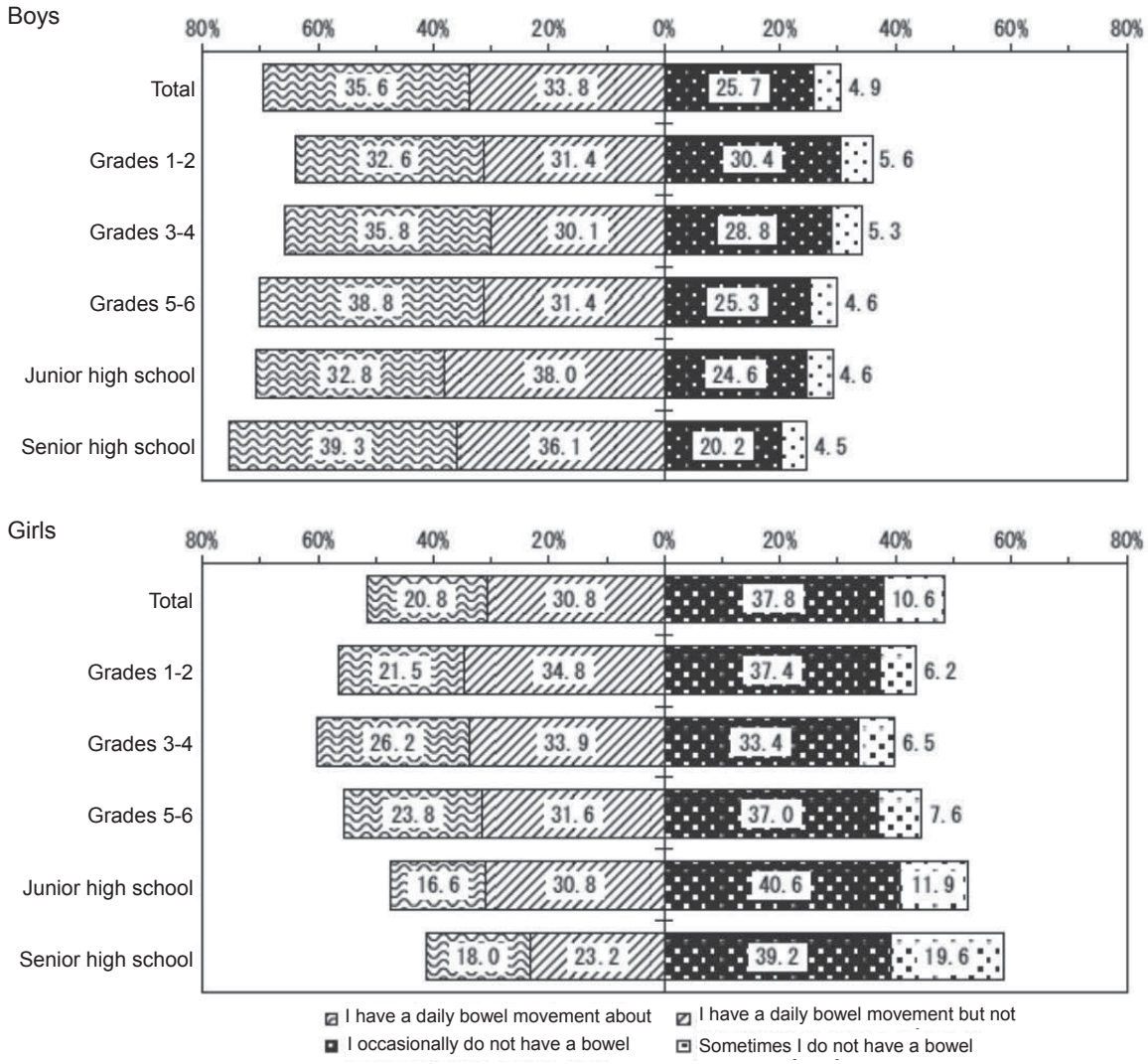


Figure 5-8 Bowel movement patterns

9 Meal intake

9.1 Breakfast

In terms of the status of breakfast intake, 95.0% of boys and 95.7% of girls overall eat breakfast almost daily, by answering either “I eat every day” or “I eat more often than I don’t” about eating a breakfast.

When compared by school age and gender, the “almost daily” group occupied 98.1% of boys and 98.4% of girls at grades 1-2, 98.0% of boys and 97.5% of girls at grades 3-4, 96.8% of boys and 96.6% of girls at grades 5-6, 93.7% of boys and 94.3% of girls at junior high school, and 89.1% of boys and 92.4% of girls at senior high school. More than 95% of boys and girls in the elementary school are having breakfast almost every day.

However, junior high school boys and girls and senior high school boys tend to skip a breakfast more often, and the proportion of “I skip more often than I do not,” “I hardly eat,” and “I skip every day” was highest in senior high school boys at 11.0%. The second highest was the senior high school girls at 7.6%, followed by junior high school boys at 6.3% and junior high school girls at 5.7%.

Additionally, with the exceptions of grades 1-2 and grades 3-4 girls, those who answered that “I eat every day” wake up earlier than those who answered “I skip every day” or “I hardly eat.” When the average wake-up time is compared between those who eat breakfast every day and those who skip every day, the boys in grades 1-2 and 5-6 and junior high school and the girls in junior high school wake up more than 30 minutes earlier, namely 35, 33, 32, and 30 minutes, respectively.

Furthermore, when compared by the body shape (thin, normal, or obese), about 10% of junior high school girls and high school children who belong to the obese group answered that “I skip more often than I do not,” “I hardly eat,” or “I skip every day” (with statistical significance). Within the thin group of senior high school girls, the answers of “I hardly eat” and “I skip every day” were high at 15.7% (with statistical significance).

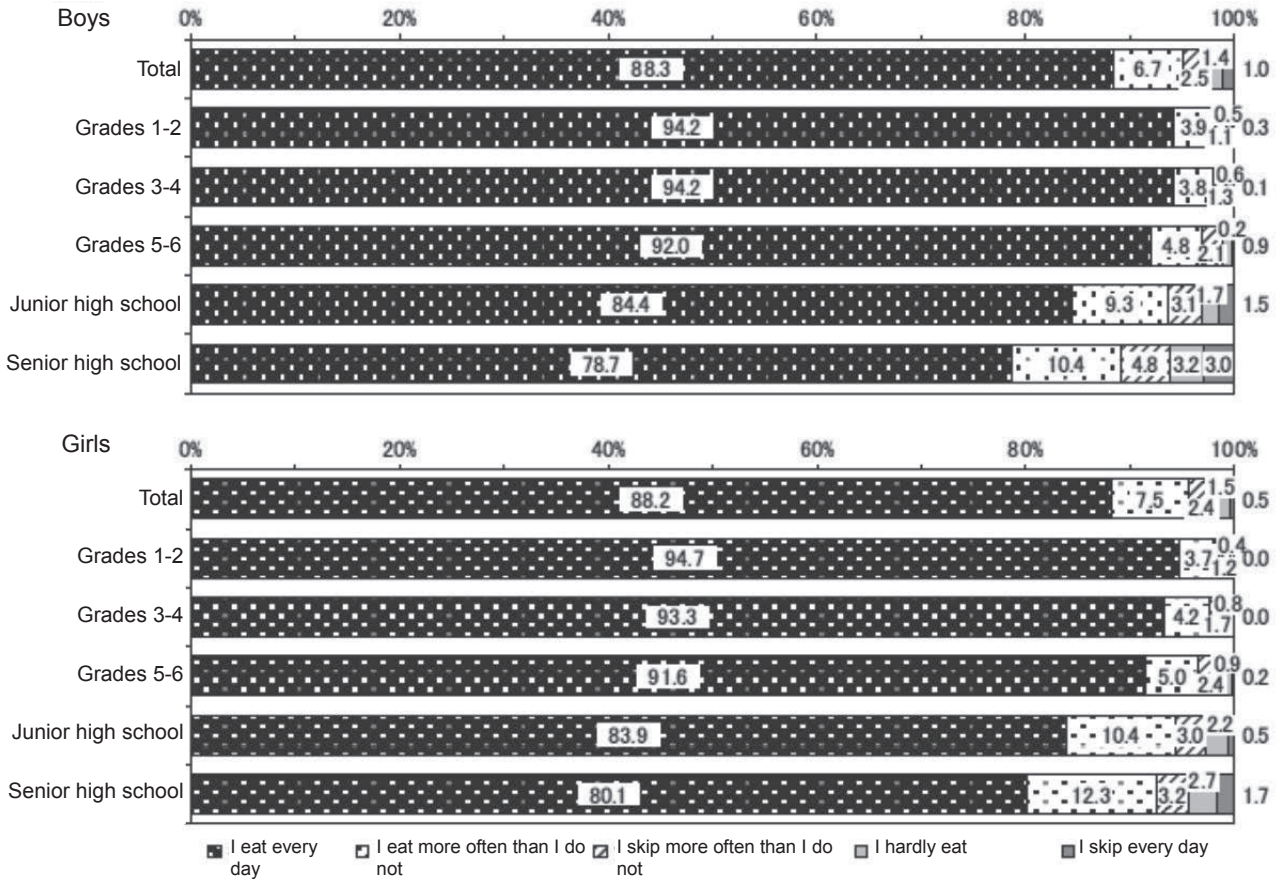


Figure 5-9-1 Status of breakfast intake

Compared to the previous surveys, the FY1981 survey in particular, the proportion of those who eat breakfast has increased in boys and girls of grades 3-4 and 5-6 but decreased in junior high school boys and girls. When compared to the previous survey, however, the figure shows an increasing trend in junior high school boys although it has decreased among girls in grades 3-4 and 5-6. The FY1981 survey did not include grades 1-2 as the target, and the figures of both boys and girls in grades 1-2 have increased when compared to the FY2004 survey but decreased by 2.0% in boys and 1.7% in girls when compared to the previous survey. The FY1981 survey did not include senior high school students, and the boys' figures has increased when compared to the FY1992 survey but decreased by 4.4% in boys and 8.0% in girls when compared to the previous survey. When compared to the survey 10 years ago, the proportions of those who eat breakfast have increased by 0.1 to 4.7%, except for the junior high school boys and senior high school girls.

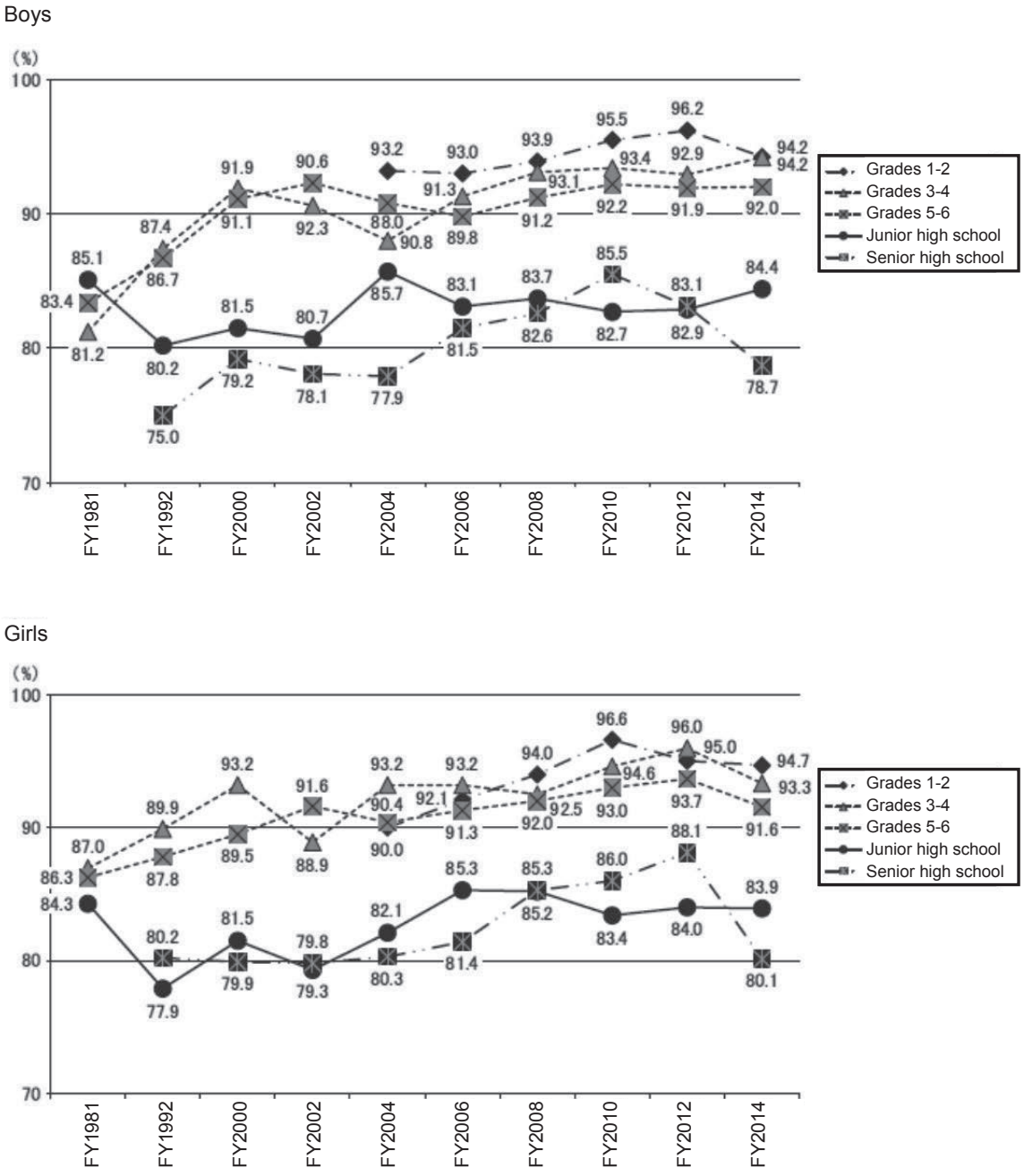


Figure 5-9-2 Annual change of breakfast intake status over time

9.2 Reason for not eating a breakfast

(Only those who answered “I skip more often than I do not” or “I hardly eat” in the previous question answered this question.)

When a question asked for the reason for not having a breakfast, the most common answer in both boys and girls overall was “I don’t have an appetite,” occupying 51.5% in boys and 50.3% in girls. The next common answer was “I don’t have the time to eat” at 37.3% in boys and 40.1% in girls. The third common answer was “A meal is not prepared” at 4.8% in boys and 4.2% in girls. Those who answered that “I don’t want to get fat” occupied 0.1% in boys and 1.6% in girls.

When compared by school age and gender, the proportion of those who answered “I don’t have the time to eat” was the highest among the senior high school boys at 41.8% and the grades 5-6 girls at 47.8%. The proportion of those who answered “I don’t have an appetite” was the highest among the grades 3-4 boys at 67.8% and the grades 1-2 girls at 68.8%. Those who answered “I don’t want to get fat” was most commonly observed among the grades 3-4 girls at 3.7% and the senior high school girls at 3.1%. Those who answered “A meal is not prepared” was most commonly observed among the senior high school boys at 7.4% and the junior high school girls at 6.9%.

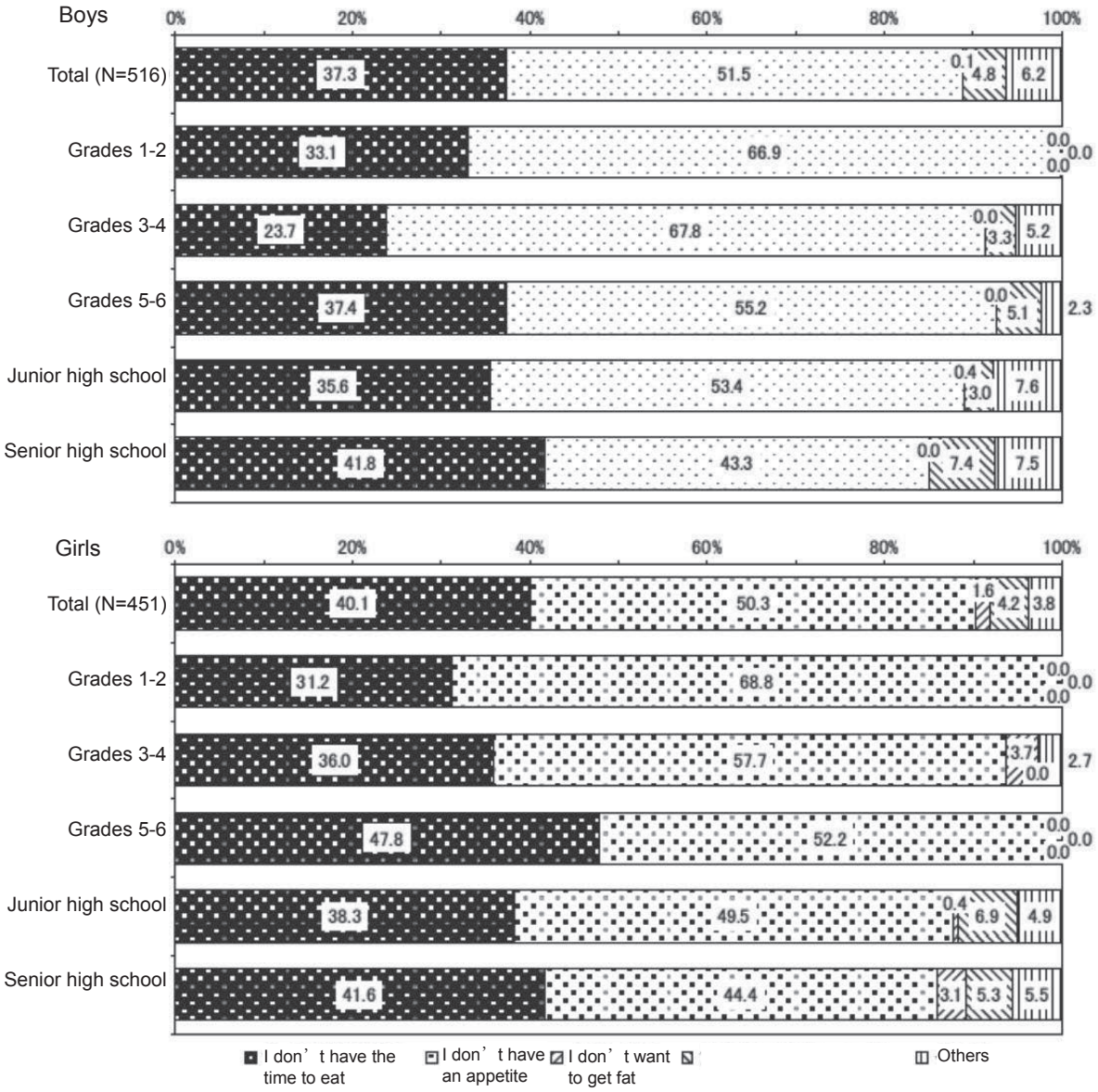


Figure 5-9-3 Reason for not eating breakfast
(Only those who answered “I skip more often than I do not” or “I hardly eat” in the previous question answered this question.)

9.3 Eating breakfast alone

When a question asked “Do you eat breakfast alone, not with any other family members?,” “36.0% of boys and 35.6% of girls are eating breakfast alone by answering “very often” or “sometimes.”

When compared by school age and gender, the “I eat my breakfast alone” group occupied 19.1% of boys and 19.3% of girls at grades 1-2, 18.9% of boys and 17.7% of girls at grades 3-4, 22.4% of boys and 21.6% of girls at grades 5-6, 49.7% of boys and 49.4% of girls at junior high school, and 63.3% of boys and 62.0% of girls at senior high school.

Those who eat breakfast alone tended to increase as a school age advances starting from grades 5-6. In particular, there are many junior and senior high school students who eat breakfast alone, accounting for roughly 50% and 60%, respectively, in both boys and girls.

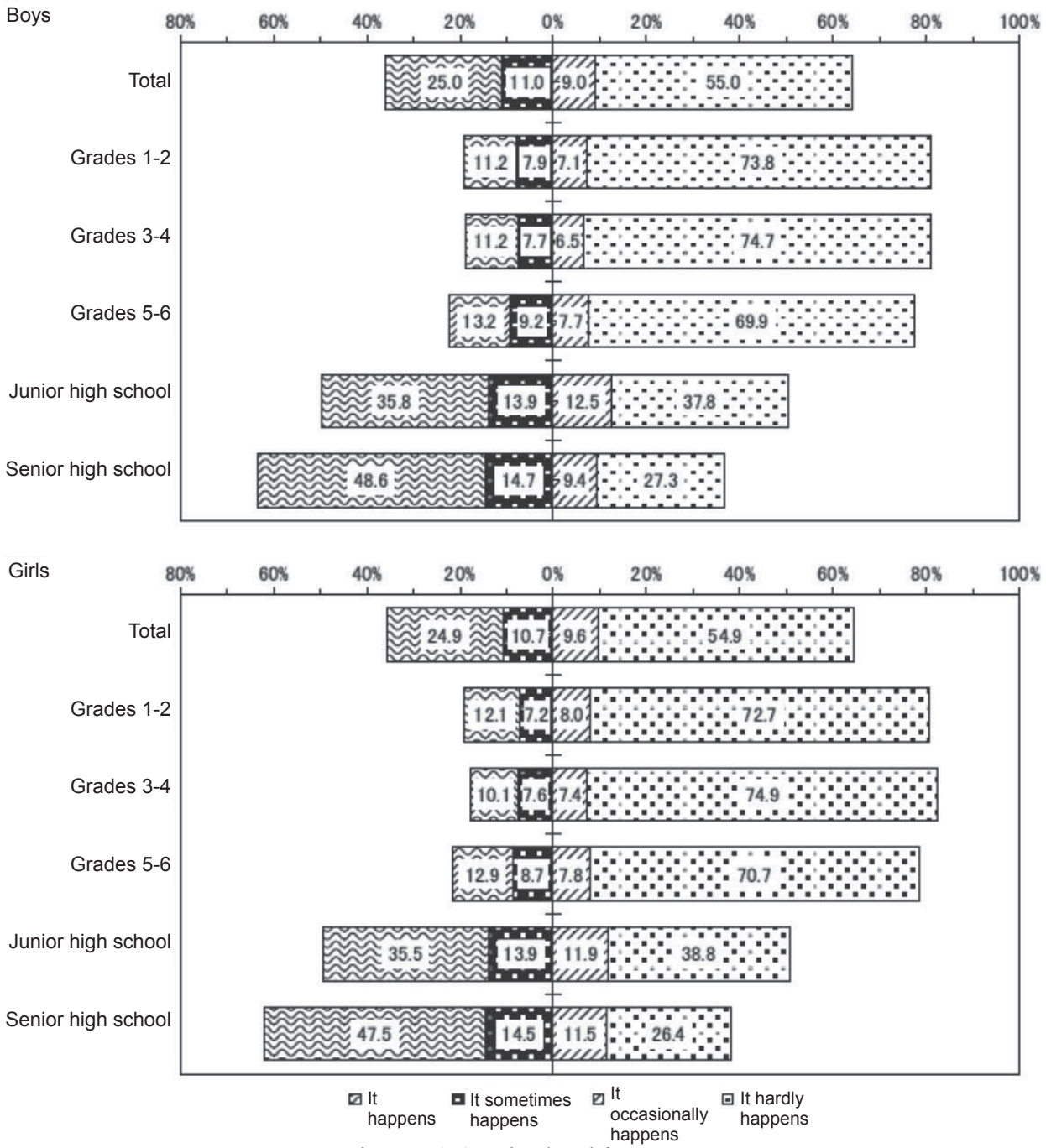


Figure 5-9-4 Eating breakfast alone

9.4 Eating dinner alone

When a question asked “Do you eat dinner alone, not with any other family members?”, “14.8% of boys and 12.9% of girls overall are eating breakfast alone by answering either “very often” or “sometimes.”

When compared by school age and gender, this “I eat dinner alone” group occupied 2.5% of boys and 1.8% of girls at grades 1-2, 4.1% of boys and 3.7% of girls at grades 3-4, 7.1% of boys and 6.1% of girls at grades 5-6, 21.5% of boys and 18.3% of girls at junior high school, and 36.1% of boys and 31.0% of girls at senior high school.

There are few who eat dinner alone among the elementary school boys and girls. However, the number of those who eat dinner alone increases as a school age advances, and it reaches roughly 20% in junior high school boys and girls and 30-35% in senior high school boys and girls.

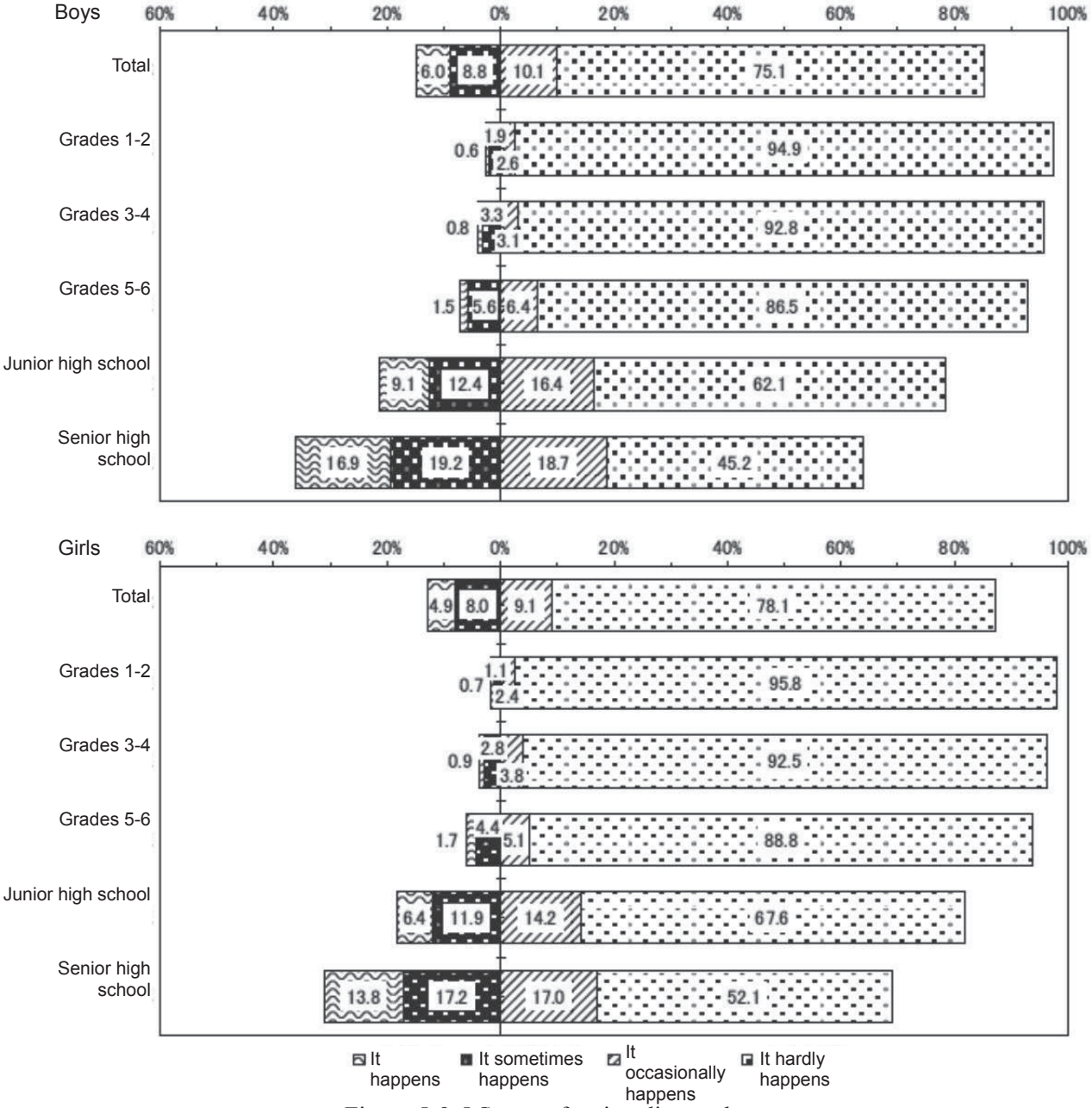


Figure 5-9-5 Status of eating dinner alone

9.5 Eating after dinner

When a question asked “Do you eat again after dinner?” the answers of “very often” or “sometimes” occupied 12.9% in boys and 6.7% in girls overall.

When compared by school age and gender, this “I eat again after dinner” group occupied 5.7% of boys and 3.7% of girls at grades 1-2, 5.6% of boys and 4.7% of girls at grades 3-4, 7.6% of boys and 5.9% of girls at grades 5-6, 18.4% of boys and 8.8% of girls at junior high school, and 24.3% of boys and 9.1% of girls at senior high school. Among the boys and girls in elementary school, a few eat again after dinner at 10% or less. However, the number increases as school age advances, in particular in boys; roughly one out of five among junior high school boys and one out of four among senior high school boys are eating again after dinner. On the other hand, the corresponding proportions in girls are less than those of boys; roughly 9% of junior and senior high school girls are eating again after dinner. Those who answered “I often eat again after dinner” also tended to answer that “I skip more often than I do not,” I hardly eat,” or “I skip every day” for breakfast, reaching 40.3% and 34.3% in junior high school boys and girls and 21.7% and 18.7% in senior high school boys and girls, respectively (with statistical significance).

Moreover, when compared by the body shape (thin, normal, or obese), the proportion of those who answered “I eat again after dinner” was higher among the obese group of grades 1-2 and grades 3-4 than other body style groups (with statistical significance).

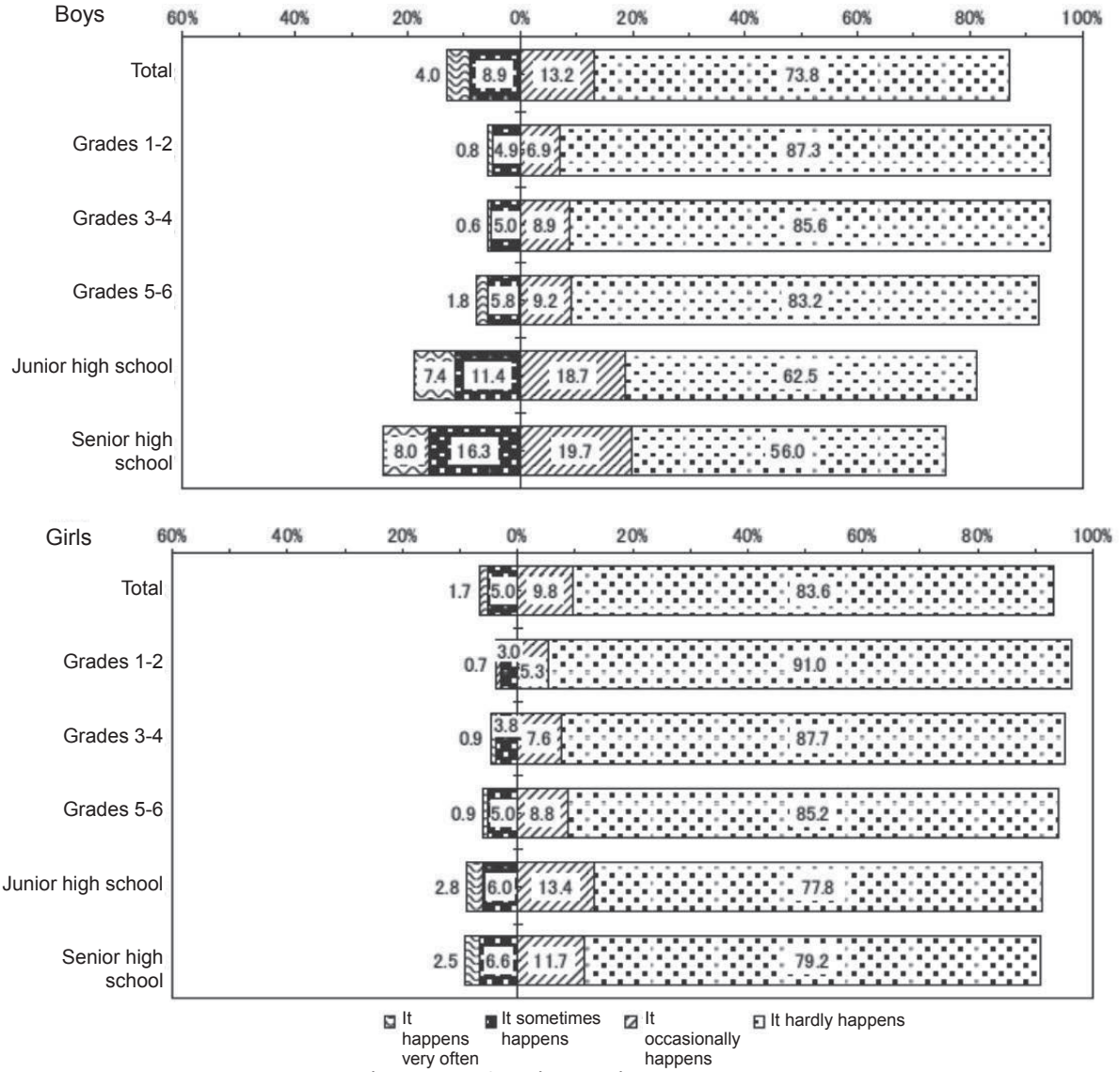


Figure 5-9-6 Eating again after dinner

9.6 The time of eating again after dinner

(Only those who answered “It happens very often,” “It sometimes happens,” or “It occasionally happens” in the previous question answered this question.)

When the average time to eat again after dinner was compared by school age and gender, it was 20:20 and 20:18 for boys and girls of grades 1-2, 20:36 and 20:28 for grades 3-4 boys and girls, 20:47 and 20:40 for grades 5-6 boys and girls, 21:27 and 21:16 for junior high school boys and girls, and 21:52 and 21:29 for senior high school boys and girls, respectively. The time to eat again after dinner becomes later as school age advances. In terms of gender, the boys in grades 3-4 and junior and senior high schools were eating again at later time than girls.

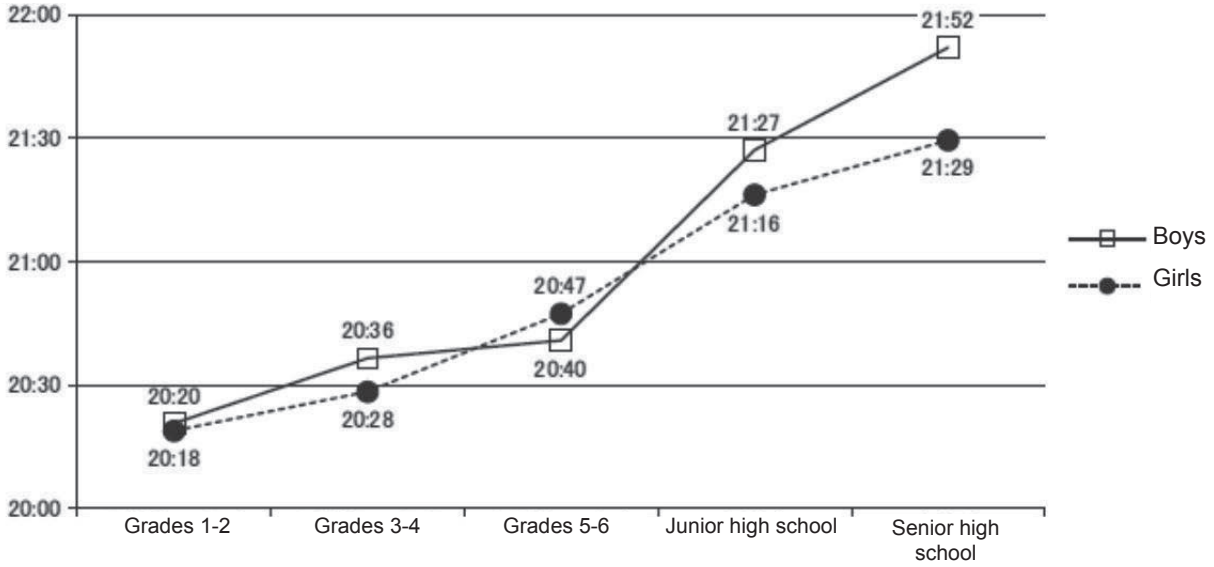


Figure 5-9-7 The time to eat again after dinner

9.7 Leaving some food on the dishes

When a question asked about leaving some food on the dishes, the answers of "very often" or "sometimes" occupied 19.9% in boys and 26.6% in girls overall.

When compared by school age and gender, this "I leave some food on the dishes" group occupied 28.4% of boys and 32.0% of girls at grades 1-2, 22.5% of boys and 28.3% of girls at grades 3-4, 17.0% of boys and 19.4% of girls at grades 5-6, 18.1% of boys and 29.3% of girls at junior high school, and 14.4% of boys and 23.1% of girls at senior high school. Across all school types, the proportions of leaving some food on the dishes are higher in girls than in boys. Additionally, roughly 30% of the grade 1-2 boys and girls, the grade 3-4 girls, and the junior high school girls answered that "I leave some food on the dishes."

When compared by the body shape (thin, normal, or obese), the proportion of those who leave some food on the dishes was higher in the thin group than in the normal or obese group, except for the grades 3-4 boys.

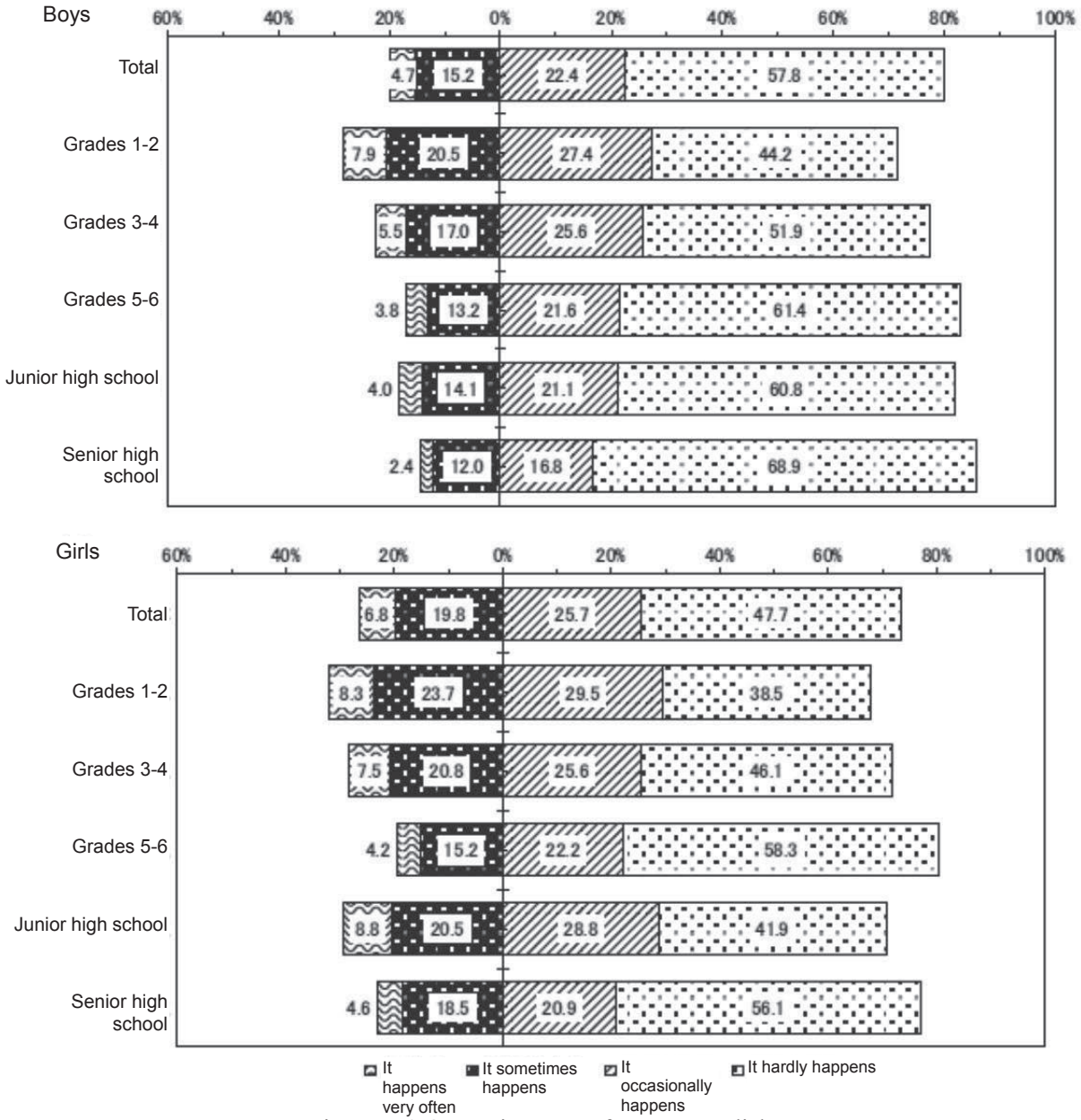


Figure 5-9-8 Leaving some food on the dishes

9.8 Reasons to leave some food on the dishes

When a respondent was asked why he/she leaves some food on the dishes, the most common answer in boys overall was “The food I dislike is on the plates” at 34.3%. The next most common answer among boys was “There are too much food” at 29.0%, followed by “I don’t have an appetite” at 22.4%. Among girls, the most common answer was “There are too much food” at 38.1%, followed by “The food I dislike is on the plates” at 32.0% and “I don’t have an appetite” at 16.2%.

When compared by school age and gender, the most common answer among the elementary school boys was “The food I dislike is on the plates,” accounting for 47.4% in grades 1-2, 43.7% in grades 3-4, and 42.2% in grades 5-6. “I don’t have an appetite” was the most common answer among the boys in junior and senior high schools, at 31.5% and 39.0%, respectively.

Among girls, “The food I dislike is on the plates” was the most common answer in grades 1-2 and grades 3-4, at 42.5% and 42.6%, respectively. “There is too much food” was the most common answer in grades 5-6 and junior and senior high schools, at 38.9%, 37.9%, and 40.2%, respectively. More junior and senior high school girls answered that “I don’t want to get fat,” accounting for 2.9% and 4.9%, respectively.

When compared by the body shape(thin, normal, or obese), the proportion of those who answered that “I don’t want to get fat” was higher in the obese group than the normal group, except for grades 3-4 and high school girls.

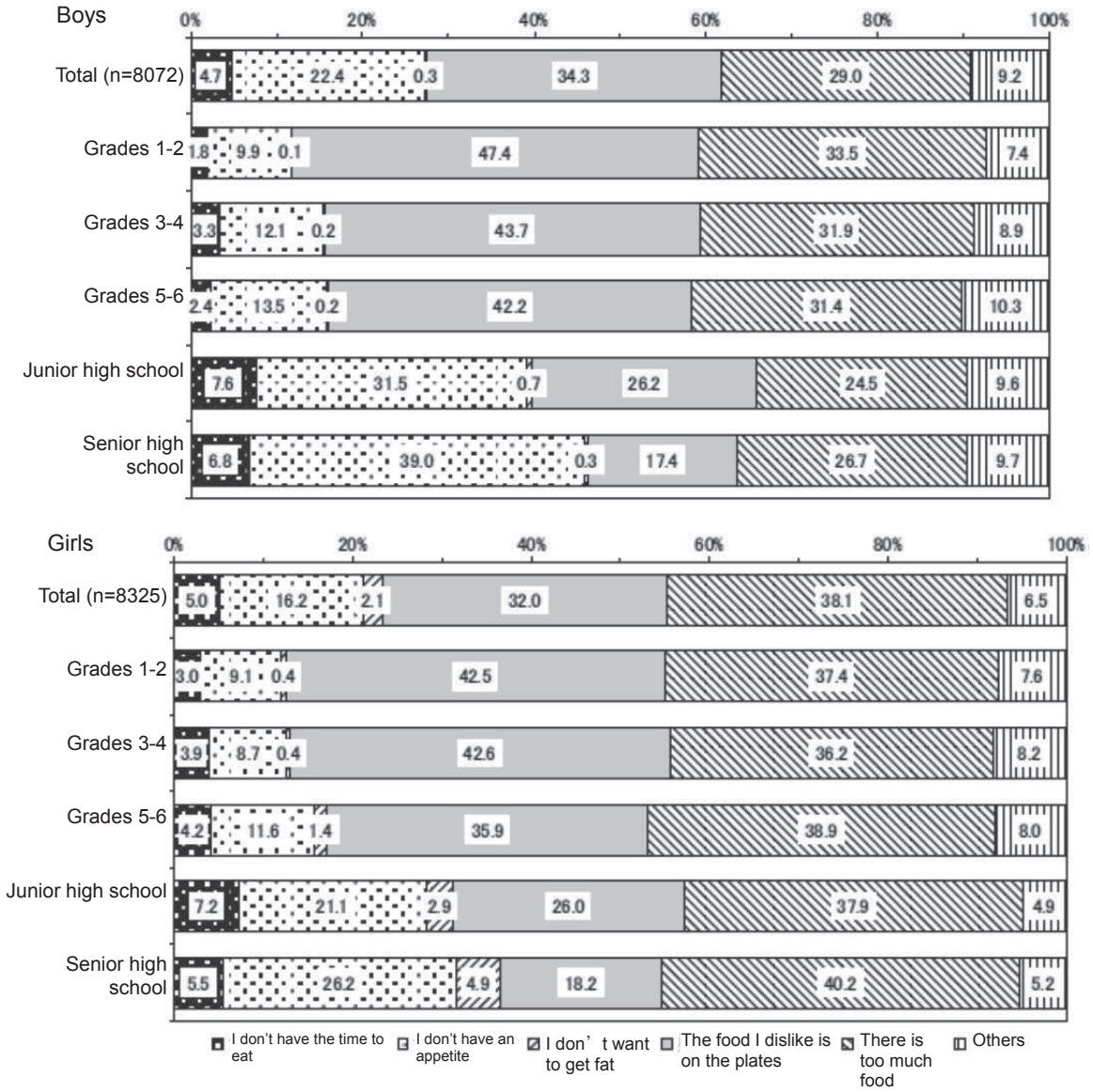


Figure 5-9-9 Reasons to leave some food on the dishes

10 Eating snacks

About continuous snacking, 21.1% of boys and 21.8% of girls are eating snacks continuously, by answering “very often” or “sometimes.”

When compared by school age and gender, this “continuously snacking” group occupied 14.1% of boys and 13.9% of girls at grades 1-2, 14.6% of boys and 13.8% of girls at grades 3-4, 16.3% of boys and 14.2% of girls at grades 5-6, 26.6% of boys and 27.6% of girls at junior high school, and 31.4% of boys and 36.4% of girls at senior high school.

Roughly one out of 6 to 7 elementary school children have a habit of continuous snacking; the number increases as school age advances, reaching as high as about 30% in boys and 36.4% in girls at senior high school. Of those who answered “I often continue eating snacks,” many answered “I often eat again after dinner;” occupying 22.5% in boys and 28.3% in girls at grades 1-2, 11.6% in boys and 17.9% in girls at grades 3-4, 17.4% in boys and 25.8% in girls at grades 5-6, 25.7% in boys and 43.9% in girls at junior high school, and 30.1% in boys and 52.2% in girls at senior high school (with statistical significance). Moreover, of whose who answered “I often continue eating snacks,” those who answered “I often leave some food on the dishes” accounted for 9.3% in boys and 5.6% in girls at grades 1-2, 15.4% in boys and 16.2% in girls at grades 3-4, 13.9% in boys and 14.9% in girls at grades 5-6, 13.6% in boys and 17.2% in girls at junior high school, and 29.9% in boys and 19.1% in girls at senior high school (with statistical significance).

When compared by the body shape (thin, normal, or obese), elementary school children answered “keep eating snacks” in obese children were more than those in the normal and thin groups.

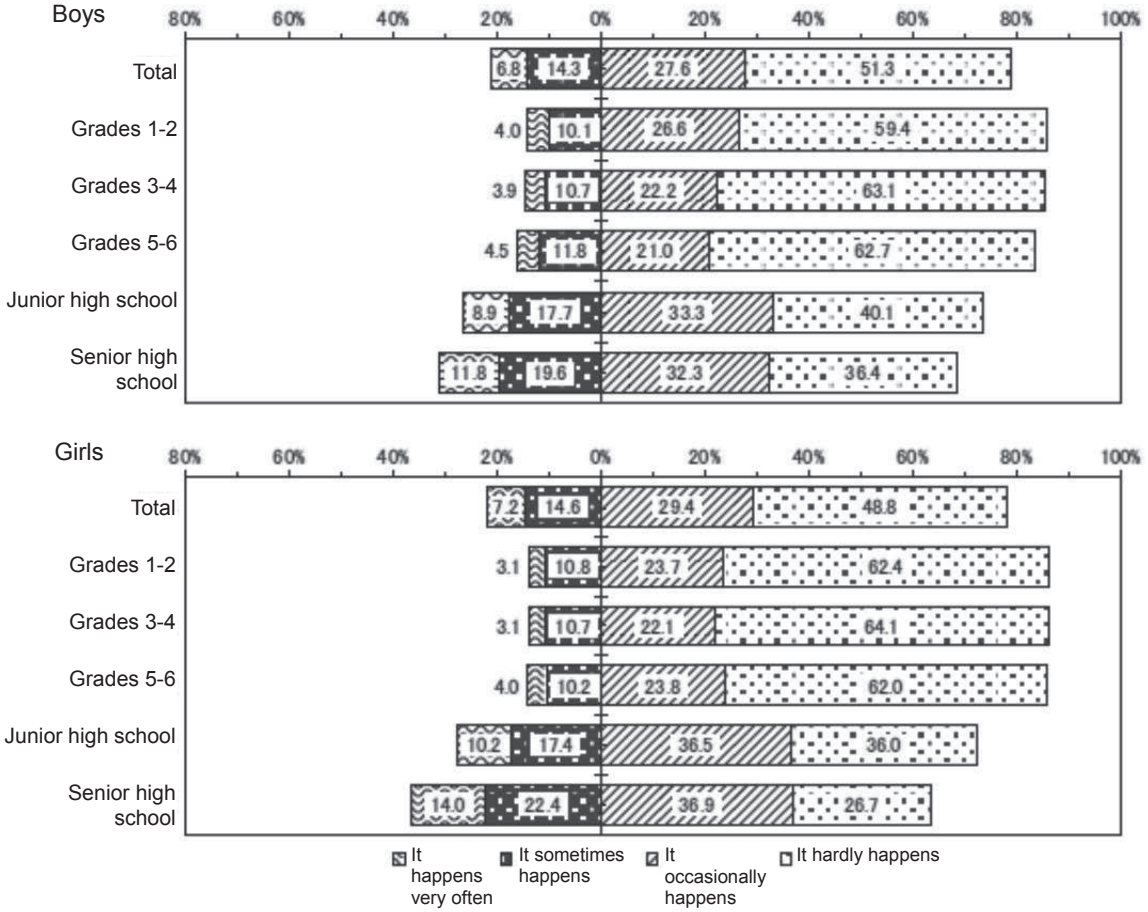


Figure 5-10. Frequency of continuous snacking

11 Meal contents

11.1 Main food for breakfast

When a question asked what children mainly eat for breakfast at home, many eat “only the staple food,” reaching 28.4% of boys and 28.8% of girls overall. The answer of “staple food, a main dish, and a side dish” was second highest at 25.7% in boys and 25.1% in girls. The answer of “staple food and a main dish” occupied 25.2% in boys and 23.2% in girls, and “staple food and a side dish” was 17.9% in boys and 19.7% in girls. The answer of “others (fruits, beverages or snacks only)” occupied 1.7% in boys and 1.8% in girls.

When compared by school age and gender, the proportion of “staple food, a main dish, and a side dish” was the highest among the grades 5-6 children at 9.1% in boys and 28.6%.in girls. Many senior high school students answered “only the staple food,” reaching 34.6% in boys and 36.1% in girls. The answer “others (fruits only, beverages only, snacks only, etc.)” was more common among junior and senior high school students compared to elementary school children, at 2.6% and 4.2% in junior and senior high school boys and 2.4% and 3.6% in junior and senior high school girls, respectively.

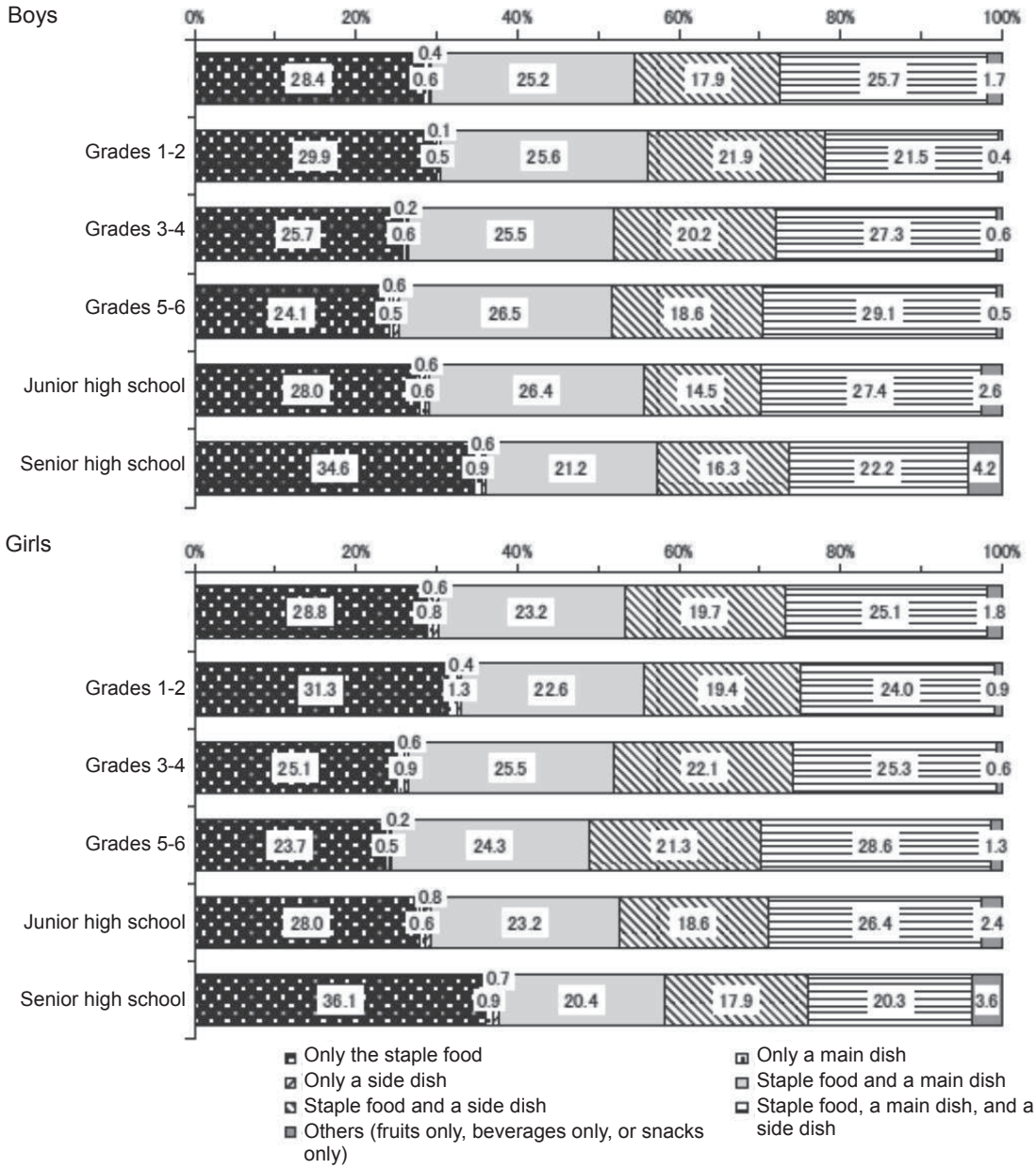


Figure 5-11-1 Food for breakfast

11.2 Main food for dinner

When a question asked what children mainly eat for dinner at home, “the staple food, a main dish, and a side dish” was the most common answer overall at 84.9% in boys and 85.3% in girls. The next most common answer was “the staple food and a main dish” at 9.3% in boys and 8.3% in girls. About 4% also answered “the staple food and a side dish.”

When compared by school age and gender, the proportion of “the staple food, a main dish, and a side dish” reached as high as over 80% except for senior high school boys and girls; the highest was grades 1-2 for boys at 88.9% and grades 5-6 for girls at 88.8%. The next highest was “the staple food and a main dish” at 12.2% in senior high school boys and 11.9% in senior high school girls.

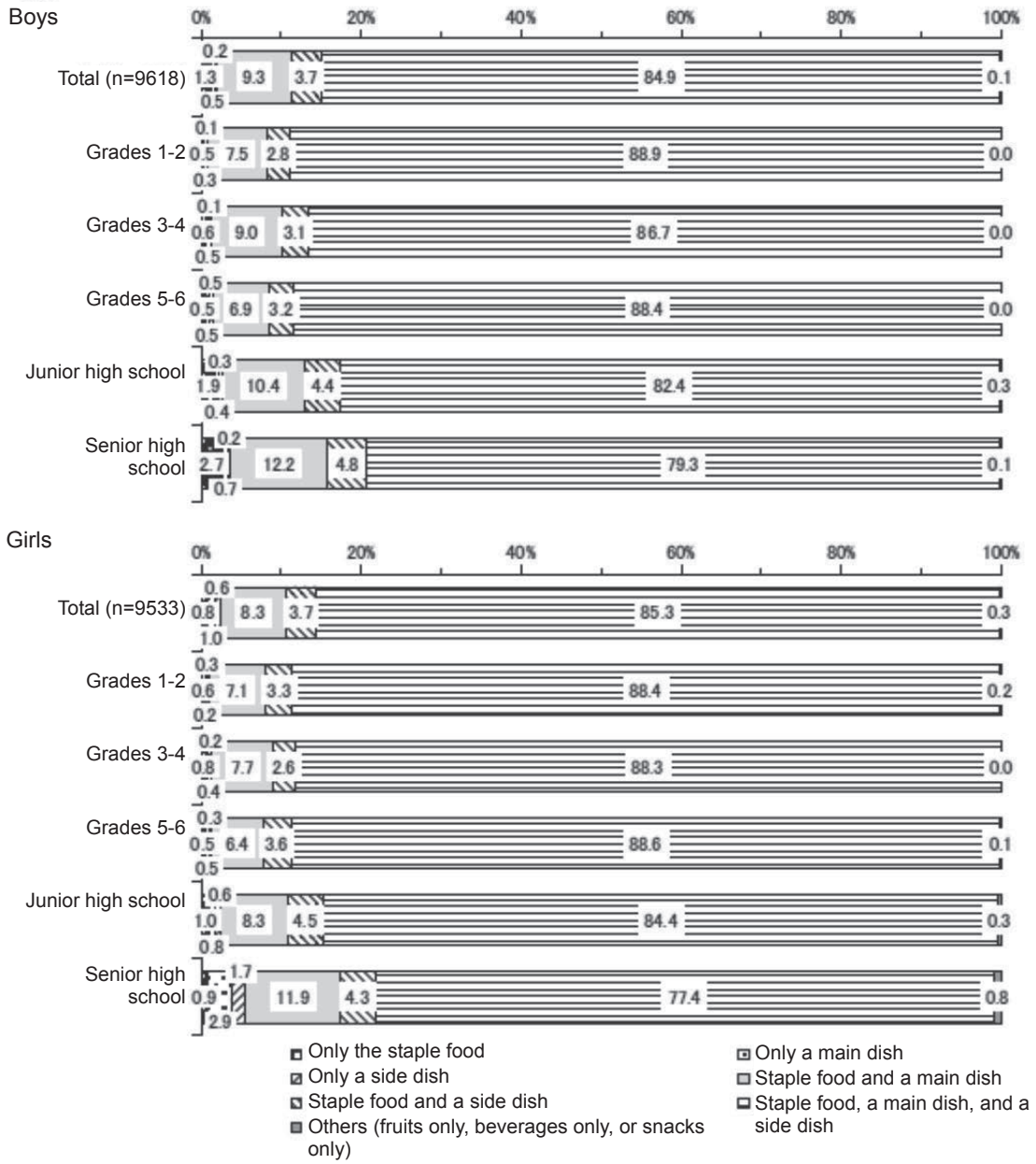


Figure 5-11-2 Food for dinner

12 Body shape and being on a diet

12.1 Self-image on his/her own body shape

When a question asked how children feel about their body shape, “I feel I am good as is” was the most common answer at 53.4% in boys and 41.6% in girls. For girls, however, the proportion of those who answered “I want to lose a little more weight” was also high, at 40.1%. “I want to lose a lot of weight” was 13.4% in girls but only 4.2% in boys. On the other hand, “I want to gain a little more weight” was 17.4% in boys but only 4.6% in girls. “I want to gain a lot of weight” was only 0.3% in girls but reach as high as 2.1% in boys.

When compared by school age and gender, the proportion of “I want to lose a lot of weight” and “I want to lose a little more weight” increases as school age advances; those who answered “I want to lose a lot of weight” reaches over 20% in junior and senior high school girls at 21.9% and 29.0%, respectively, and “I want to lose a little more weight” reaches over 50% in junior and senior high school girls at 55.2% and 50%, respectively -- these figures suggest that about 70 to 80% of junior and senior high school girls especially have a desire for thinness compared to other school ages or to boys. On the other hand, “I want to gain a little more weight” increases in boys as school age advances and reaches 24.4% at senior high school, whereas it decreases in girls as school age advances at 6.8% in grades 3-4 being the lowest. The proportion of those “I feel I am good as is” decreases as school age advances, but was generally higher in boys than in girls across all school types.

When compared by the body shape (thin, normal, or obese), about 10% of junior high school boys, grades 3-4 girls, and junior high school girls and about 20% of senior high school girls in the thin group answered that “I want to lose a lot of weight” or “I want to lose a little more weight” (with statistical significance). In the obese group, on the other hand, the proportions of those who answered “I feel I am good as is” in the grades 1-2 children, junior high school boys, and high school boys were high, at about 20% (with statistical significance). Moreover, more boys in the obese group answered “I want to gain a little more weight” or I want to gain a lot of weight” compared to the girls in the obese group across all school types, reaching as high as 5.9% in grades 1-2 boys, 3.6% in grades 3-4 boys, 3.2% in junior high school boys, and 3.7% in senior high school boys.

The answers of “I feel I am good as is” and “I want to gain a little more weight” were more commonly observed in both boys and girls overall this time compared to the last survey four years ago. On the other hand, the answers of “I want to lose a lot of weight” and “I want to lose a little more weight” decreased in both boys and girls overall; however, when compared by school age and gender, “I want to lose a lot of weight” in senior high school girls decreased by about 5% but “I want to lose a little more weight” increased by about 5%.

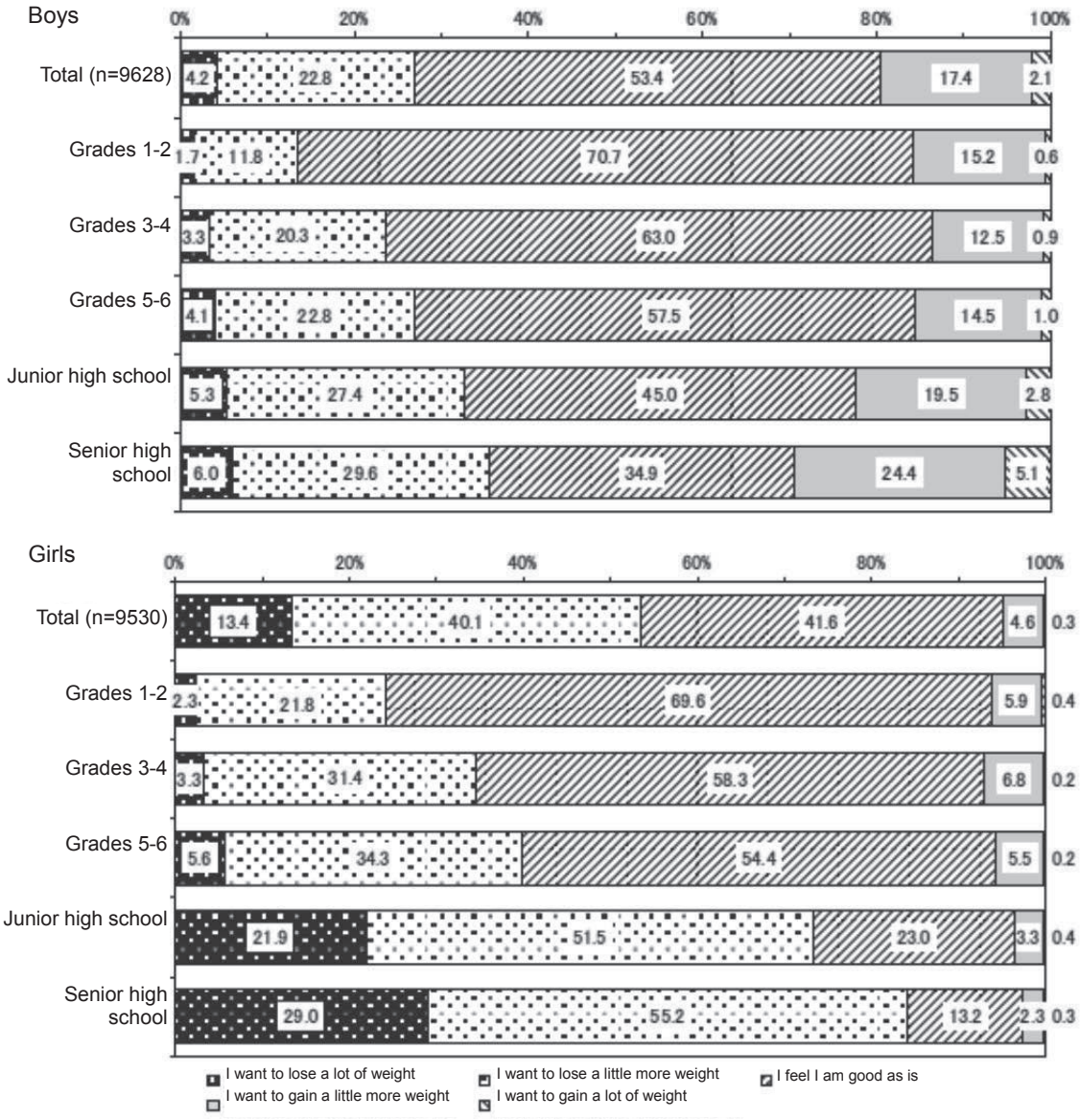


Figure 5-12-1 Self-image on his/her own body shape

12.2 Experience of making an effort to lose weight (being on a diet)

When a question asked if a respondent has tried to lose weight (be on a diet), the most common answer was "I have never actually did" at 88.0% in boys and 74.5% in girls. The second most common answer was "I have been on a diet following my own plans" at 10.3% in boys and 24.3% in girls. The answer of "I have been on a diet under doctor's supervision" or "I have been on a diet under school teacher's supervision" was very few, accounting less than 1% in both boys and girls.

When compared by school age and gender, "I have been on a diet following my own plans" was the most common answer in both boys and girls across all school types, but the figure became lower as school age advanced. On the other hand, the proportion of those who answered that "I have been on a diet following my own plans" increased as school age advances, reaching 36.1% in junior high school girls and 55.3% in senior high school girls. The answer of "I have been on a diet under doctor's supervision" or "I have been on a diet under school teacher's supervision" was less than 1% in both boys and girls across all school types. The answer "I have been on a diet following my own plans" was more common than the answer "I have never actually did" among senior high school girls, and roughly one in two answered that "I have been on a diet before." The answer "I have been on a diet before" was more commonly observed among those who answered "I want to lose a lot of weight" or "I want to lose a little more weight" (with statistical significance).

In terms of the body shape (thin, normal, or obese), with the exception of junior and senior high

school girls in the obese group, more than 50% answered that “I have never actually did” (with statistical significance). With the exception of junior and senior high school girls in the obese group, those who answered “I have been on a diet based on my own ideas” occupied roughly 20 to 30%; it was about 60% in junior and senior high school girls. Those who answered either “I have been on a diet under doctor’s supervision” or “I have been on a diet under school teacher’s supervision” were most commonly observed among the grades 3-4 boys at 21.1%, followed by the grades 5-6 boys and girls at about 15%. “Others” occupied 5 to 10%, but the proportion was higher in the obese group than in the normal or thin group (with statistical significance).

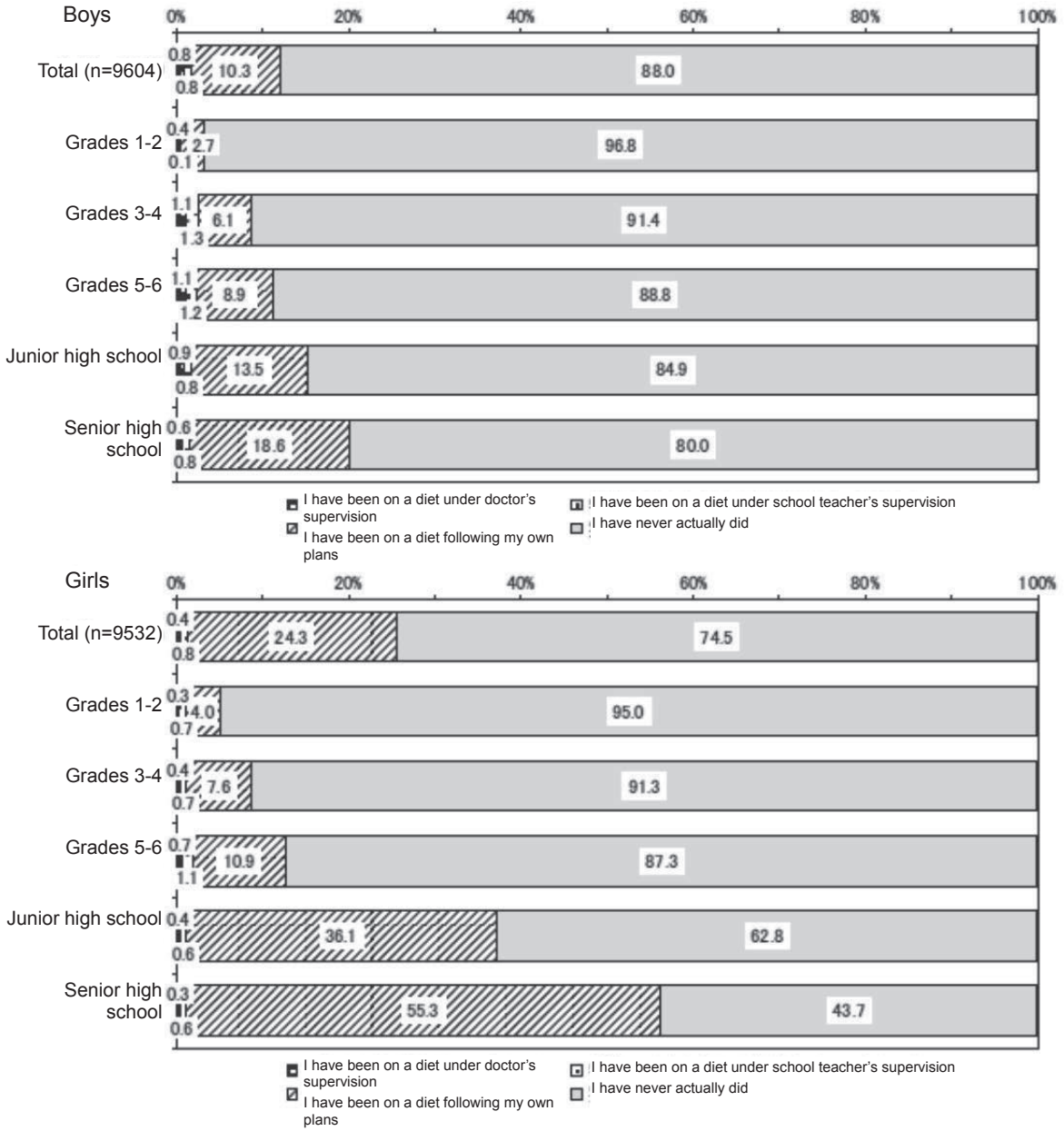


Figure 5-12-2 Experience of making an effort to lose weight (being on a diet)

13 The time of exercise and the amount of energy consumption in a week

13.1 Proportion of those who are physically active

Those who are regularly involved in extracurricular activities or physical plays during free time occupied 73.9% in boys and 56.2% in girls. In terms of school age, about 75% of boys in elementary school and junior high school are involved in physical plays; however, the figure decreases in senior high school to 64.2%. In girls, about 70% at grades 1-4, 57.9% at grades 5-6, 52.4% at junior high school are involved in physical plays, but it decreases drastically to 36.0% at senior high school. These figures suggest that more boys regularly participate in physical activity than girls, and the proportion decreases as a child advances in school ages; in particular, senior high school girls was remarkably low.

When compared to the last survey, the proportion of those who are involved in physical plays stayed roughly the same in both boys and girls in elementary school and junior high school but decreased in both boys and girls in senior high school.

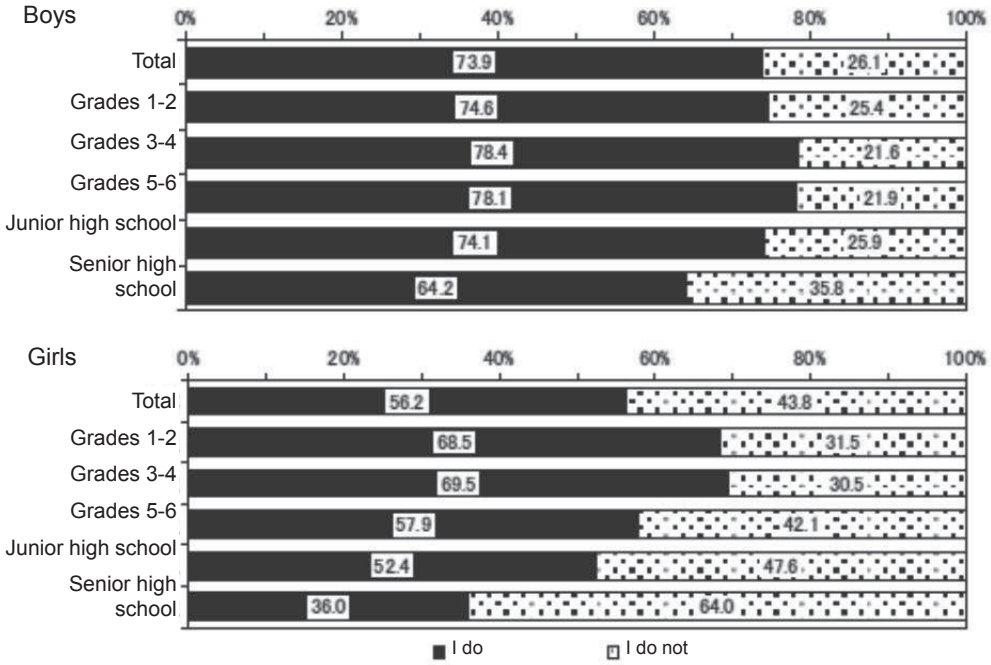


Figure 5-13-1 Proportion of those who are physically active

When the proportion of those who are physically active is examined in relation to the body shape, the boys in the obese group were lower than the standard group (within +/-20 of overweight index) across all school ages; it was particularly low in elementary school grades. The boys in the thin group was even lower than the obese group, at 60.0% in junior high school and 47.2% in senior high school. The same was true for the girls in the obese group; the proportion of those physically active was lower than the standard group across all school ages. As for the girls in the thin group, no certain trend was observed among elementary school grades because the number of applicable girls was small, but the proportion of those who are physically active at junior and senior high school was low, especially among the thin senior high school girls at 27.3%.

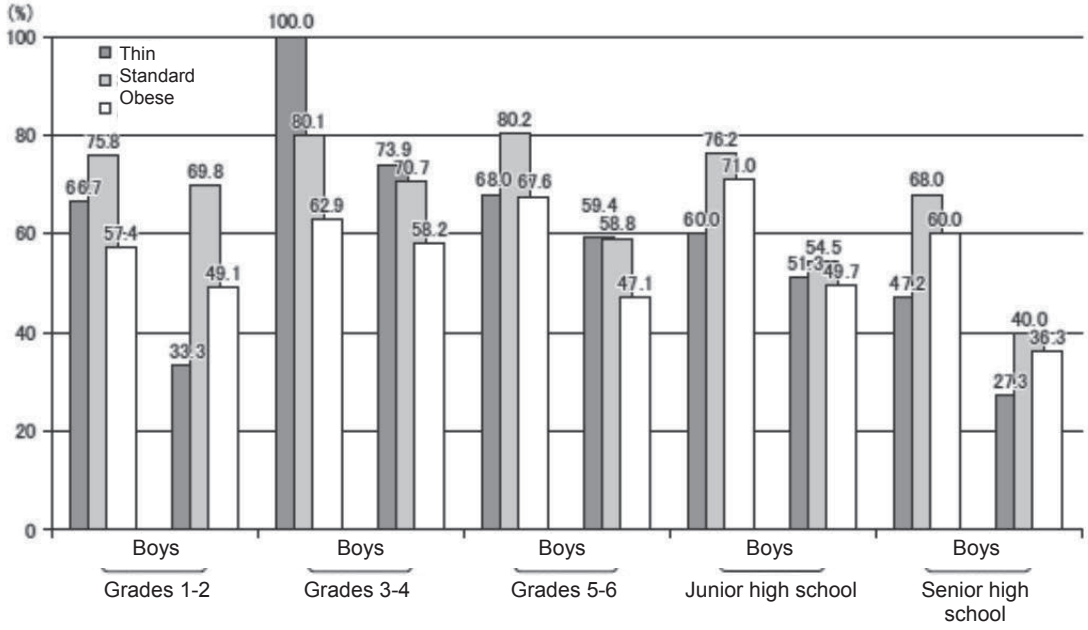


Figure 5-13-2 Proportion of those who are physically active by the body shape

13.2 Time of exercise in a week

For boys, the average time of exercise in a week by intensity was 3:58 (hh:mm) (median 2:00; herein after the time in parenthesis refers to a median) for high-intensity exercise, 2:46 (1:30) for medium-intensity exercise, and 1:42 (1:00) for low-intensity exercise. For girls, the average time of high-intensity exercise was 3:24 (1:30), 2:19 (1:00) for medium-intensity exercise, and 1:29 (1:00) for low-intensity exercise.

In terms of school age, the average time of high-intensity exercise tended to increase as school age advanced; it was 2:13 (1:00) for grades 1-2, 3:27 (2:00) for grades 3-4, 4:02 (3:00) for grades 5-6, 4:13 (2:00) for junior high school, and 5:09 (2:30) for senior high school boys; 1:35 (1:00) for grades 1-2, 2:38 (1:00) for grades 3-4, 3:31 (2:00) for grades 5-6, 3:47 (2:00) for junior high school, and 5:02 (2:00) for senior high school girls. The average time of medium-intensity exercise tended to increase as school age advanced; it was 2:14 (1:00) for grades 1-2, 2:35 (1:40) for grades 3-4, 2:39 (2:00) for grades 5-6, 2:47 (1:00) for junior high school, and 3:35 (1:30) for senior high school boys; 1:50 (1:00) for grades 1-2, 2:05 (1:00) for grades 3-4, 2:09 (1:00) for grades 5-6, 2:30 (1:00) for junior high school, and 3:03 (1:00) for senior high school girls. The average time of light-intensity exercise for boys tended to decrease as school age advanced but slightly increased at senior high school; it was 1:47 (1:00) for grades 1-2, 1:42 (1:00) for grades 3-4, 1:35 (1:00) for grades 5-6, 1:26 (1:00) for junior high school, and 2:08 (1:00) for senior high school boys. For girls, it was 1:31 (1:00) for grades 1-2, 1:27 (1:00) for grades 3-4, 1:23 (1:00) for grades 5-6, 1:13 (0:30) for junior high school, and 1:31 (0:40) for senior high school.

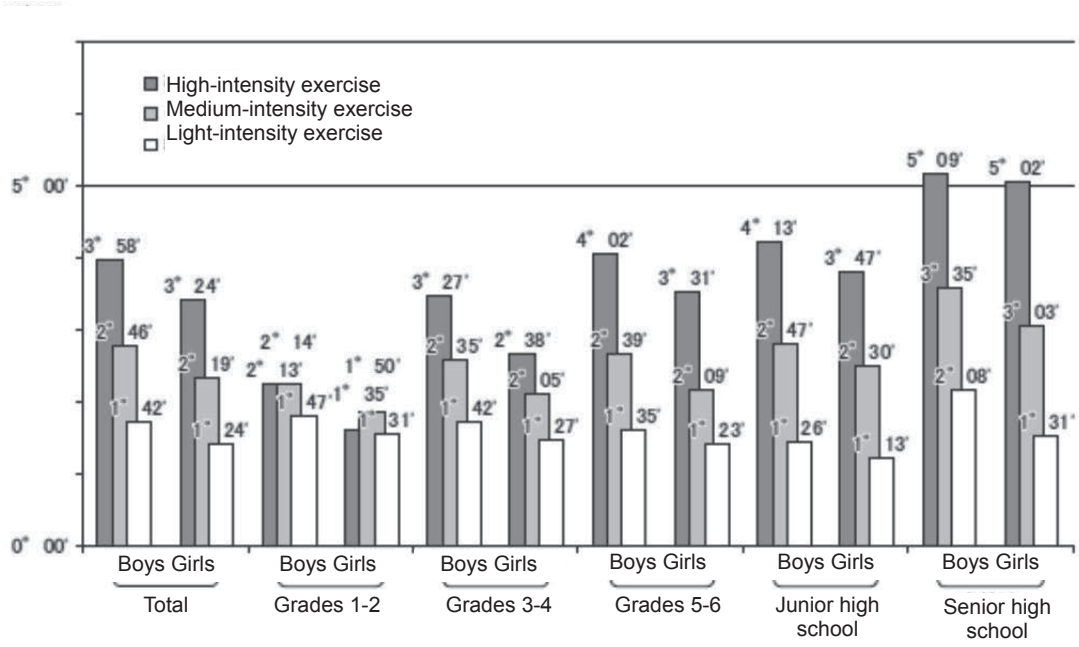
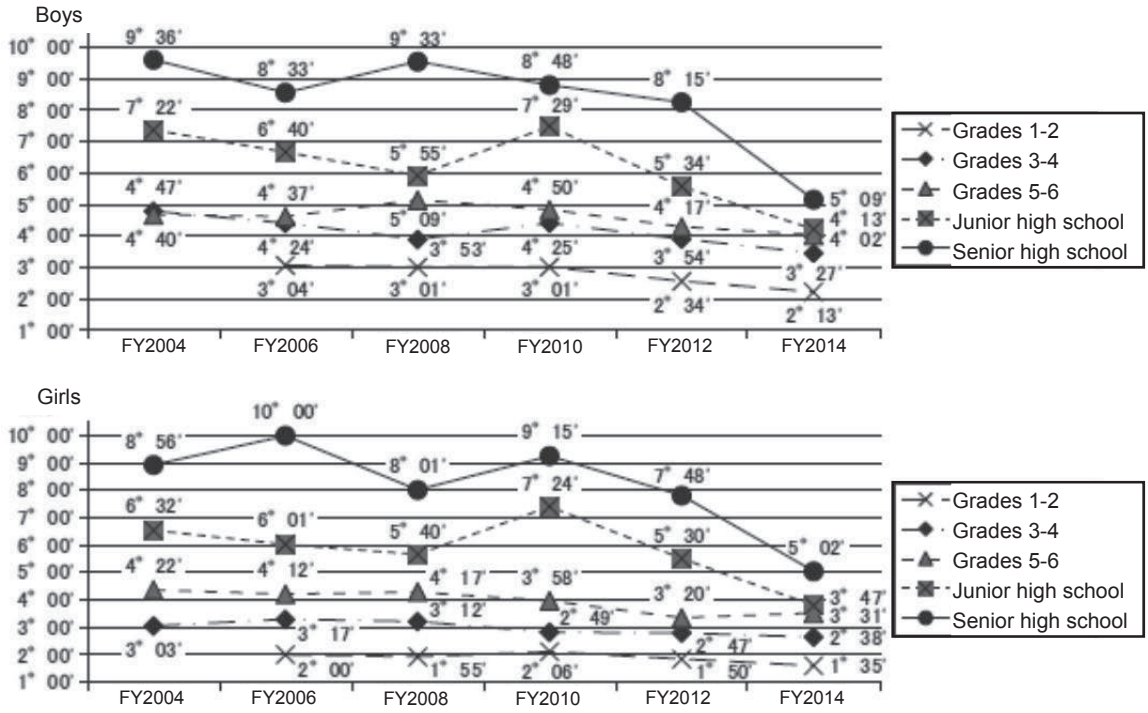


Figure 5-13-3 Average time of exercise in a week by the intensity level

The annual change has shown a gradual decrease in exercise time, but this survey showed a marked reduction in high- and medium-intensity exercise times in both boys and girls compared to the FY2012 survey, particularly for junior and senior high schools. The reduction in the time for light-intensity exercise was small.

Time spent for high-intensity exercise in a week (answered only by those who answered “Yes” to the previous question)



Time spent for medium-intensity exercise in a week (answered only by those who answered “Yes” to the previous question)

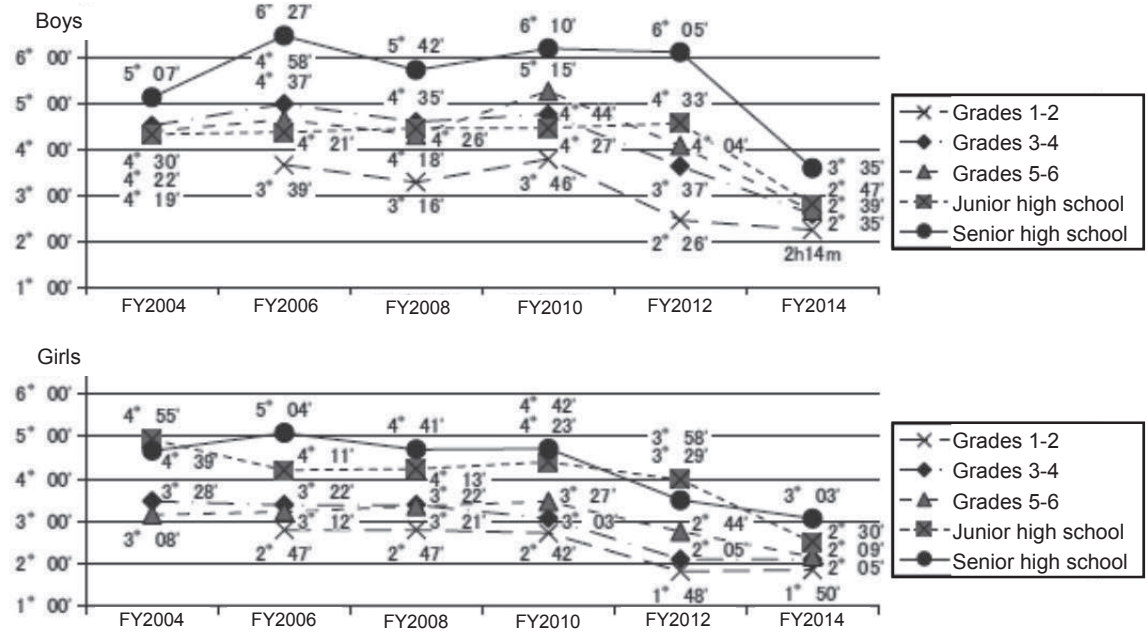


Figure 5-13-4 Changes in the average time of exercise in a week (Part 1)

Time spent for light-intensity exercise in a week (answered only by those who answered “Yes” to the previous question)

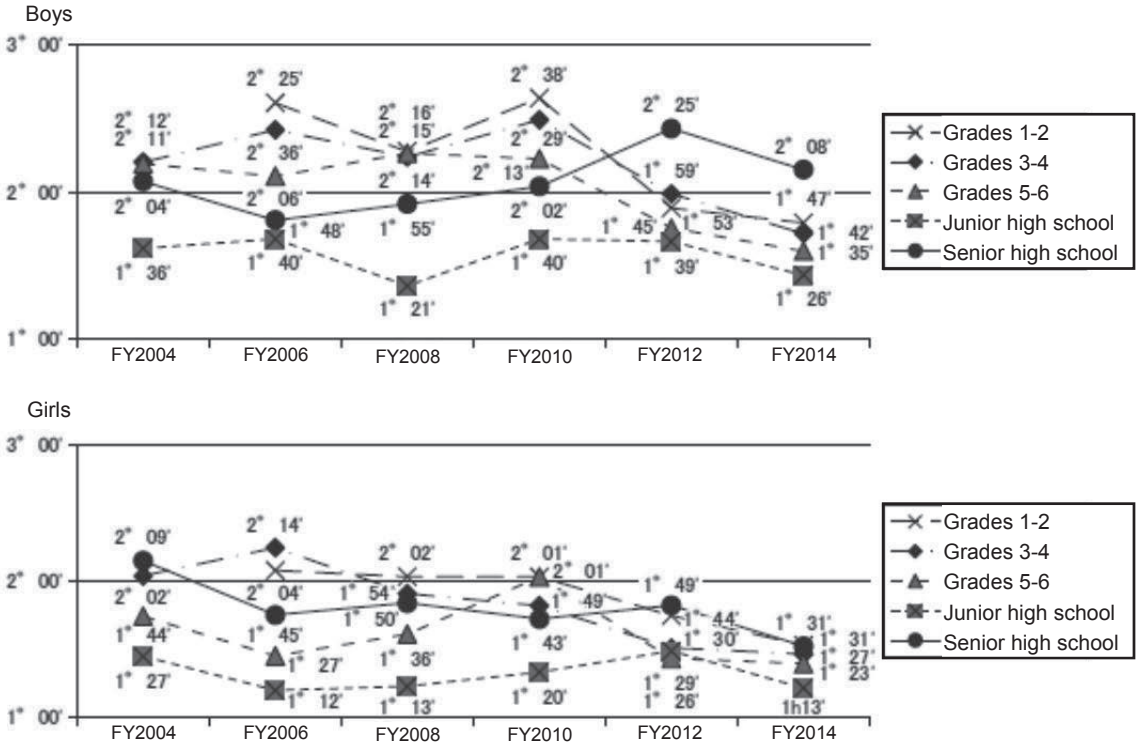


Figure 5-13-4 Changes in the average time of exercise in a week (Part 2)

The total time of exercise on average, including high, medium, and low intensity levels, was 5:46 (3:20) for boys and 4:05 (2:00) for girls. In terms of school age, it tended to increase in boys as school age advances; it was 3:52 (2:30) for grades 1-2, 5:08 (4:00) for grades 3-4, 5:30 (4:00) for grades 3-6, 6:19 (3:30) for junior high school, and 7:48 (3:05) for senior high school boys. It also tended to increase for girls as school age advances; it was 2:49 (2:00) for grades 1-2, 3:39 (2:00) for grades 3-4, 3:52 (2:00) for grades 5-6, 4:49 (2:00) for junior high school, and 4:59 (1:40) for senior high school girls.

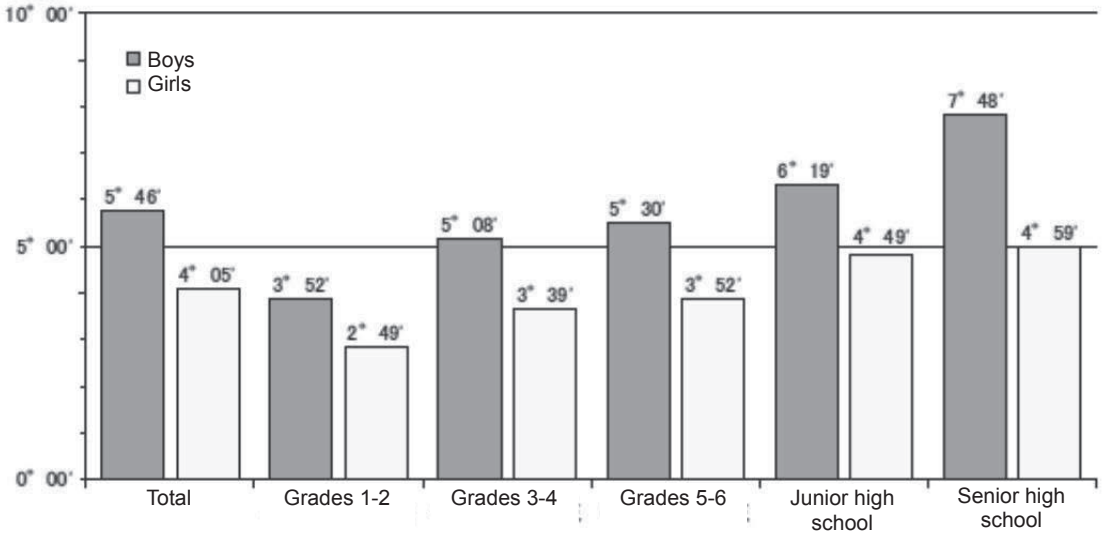


Figure 5-13-5 Average time of exercise in total in a week

The distribution of the total exercise time shows that the less than 4 hours occupies a high percentage in both boys and girls across all school ages. The distribution of the 4 to 10 hours decreases from elementary school grades as school age advances, but the distribution of 10 hours or more increases as school age advances. The 20 hours or more were observed more often among senior high school grades compared to other school age. This suggests that some spend a little time in exercise but some spend a lot among senior high school students. As stated above, exercise time tends to decrease for many as school age advances; however, those involved in extracurricular activities in junior or senior high school spend longer time in exercise, resulting in a bipolar distribution in the total exercise time.

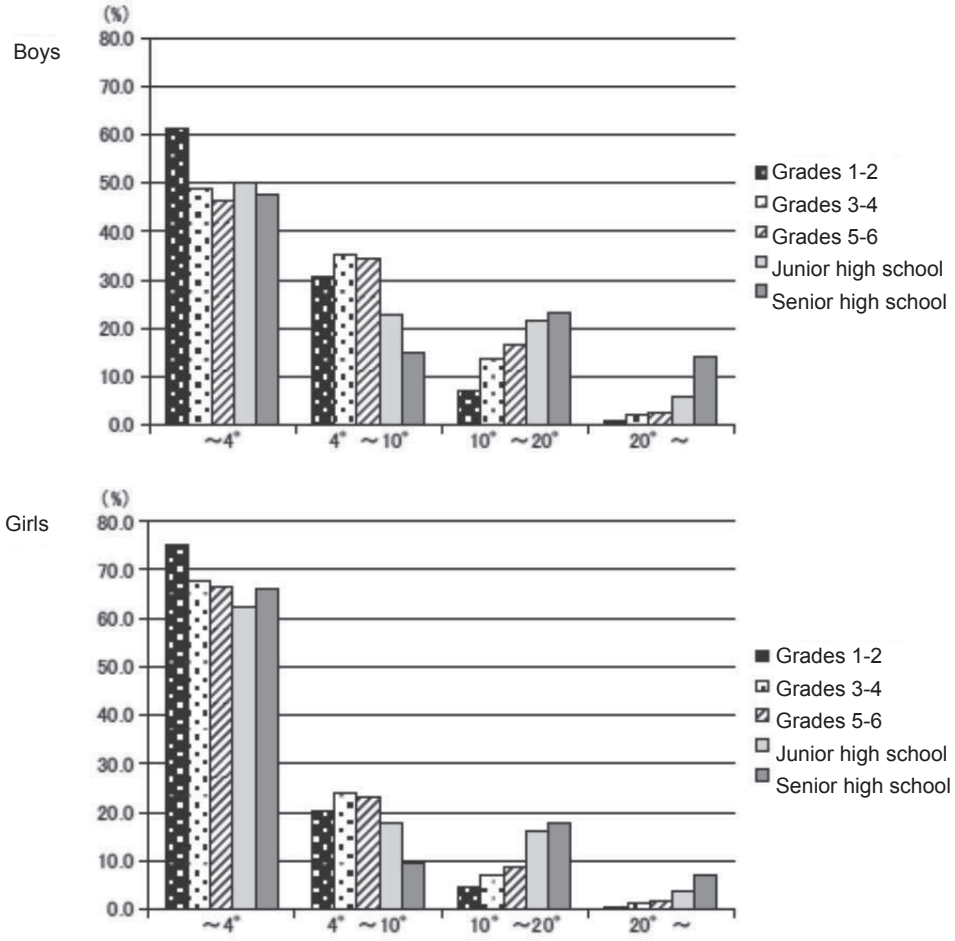


Figure 5-13-6 Distribution of the total exercise time in a week

Compared with the last survey, the average time for exercise tended to decrease considerably across all school ages nationwide, and the data distribution showed less number of children with long hours.

When the total time of exercise was examined by body shape, the boys in the obese group tended to spend less time in exercise than the normal group did across all school ages. The same was true for the thin group except for grades 3-4, and the tendency of shorter time was more prominent especially in grades 5-6 and senior high school boys. For girls, there was no difference between the normal group and the obese group in elementary school, but the obese group tended to be shorter than the normal group in high schools. As for the thin group, its population size for elementary school ages was small and no evident tendency was confirmed, but high school children in the obese group tended to spend less time; in particular, senior high school children spent half the time of the normal group in both boys and girls, spending significantly less time for exercise.

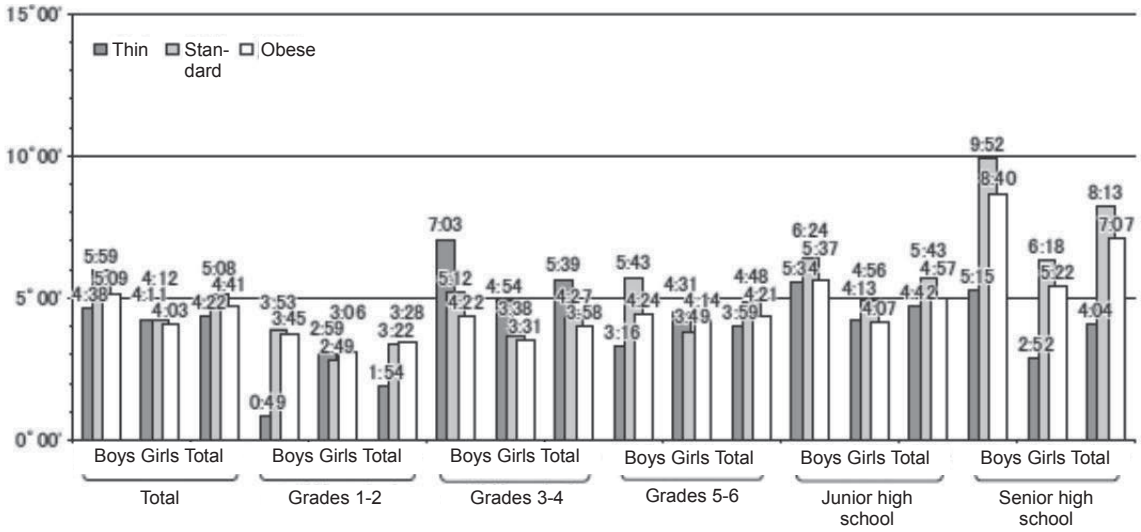


Figure 5-13-7 Total exercise time by body style

13.3 Amount of energy consumption due to exercise

One method of measuring the intensity of exercise is to show the proportion of energy consumed in exercise using the energy consumption of basal metabolism (BMR) or of resting-metabolism (RM) as the baseline. Typically, it is represented as follows.

Af (activity factor) = Amount of energy consumption when exercising / BMR

Until now, we have been using the following equation.

RMR (resting metabolic rate, *RMR = relative metabolic rate) = (energy consumption when exercising - RM) / BMR

However, a following relationship
Af (intensity of exercise) = RMR (basal metabolic rate) + 1
generally exists between Af (intensity of exercise) and RMR (basal metabolic rate).

In this report, we used the case studies that describe each exercise to calculate the amount of energy consumed due to exercise, and assumed Af as shown in Table 10-2-1. The recommended dietary allowance for Japanese (6th ed.) was also used as a reference for the BMR for each school age, and the values shown in Table 10-2-2 were used. Each school age spans over 2 years in age (eg. grade 3 includes ages 8 and 9), so the higher age (eg., age 9 in the case of grade 3 children) was used in calculation because the survey took place in January to February. The exercise time in a week was asked in the survey questions, but the amount per day was used when calculating the amount of energy required. The amount of energy consumption also includes the basal metabolism using the intensity of exercise. Therefore, the amount of energy consumption due to exercise excluding the basal metabolism was calculated. Specifically, the following values were calculated.

Table 13-3-1 The activity factor (Af) and the RMR (resting metabolic rate) values assumed for different types of exercise

Exercise types	Af	RMR
High-intensity exercise	8	7
Medium-intensity exercise	5	4
Light-intensity exercise	3.5	2.5

Amount of energy consumption due to exercise per day per 1kg of body weight =
[Time of high-intensity exercise (min) x (8-1) + Time of medium-intensity exercise (min) x (5-1) + Time of light-intensity exercise (min) x (3.5-1)] x Standard BMR for a given age and gender (kcal/kg/min) / 7

Amount of energy consumption due to exercise per day =
Amount of energy consumption due to exercise per day per 1kg of body weight x Body weight

Table 13-3-2 Standard BMR (kcal/kg/day) by age and gender

Age (in years)	Grade	Boys	Girls
6-8	Grades 1-2	44.3	41.9
9-11	Grades 3-5	37.4	34.8
12-14	Grades 6-8 (Grade 6 through junior high school)	31.0	29.6
15-17	Grades 9-11 (Senior at junior high school)	27.0	25.3
18-29	Grade 12 (Senior at senior high school)	24.0	23.6

The energy consumption due to exercise per 1 kg of body weight was 5.6 kcal for boys and 3.6 kcal for girls. The specific values by school age for boys was 4.5kcal for grades 1-2, 5.6kcal for grades 3-4, 5.8kcal for grades 5-6, 6.0kcal for junior high school, and 6.3kcal for senior high school boys. For girls, it was 2.8kcal for grades 1-2, 3.5kcal for grades 3-4, 3.6kcal for grades 5-6, 4.1kcal for junior high school, and 3.6kcal for senior high school girls. The energy consumption per 1kg of body weight tended to increase in both boys and girls as school age advanced, except it dropped for girls in senior high school. Compared to the FY2002 survey, the energy consumption per 1 kg was clearly reduced at all ages.

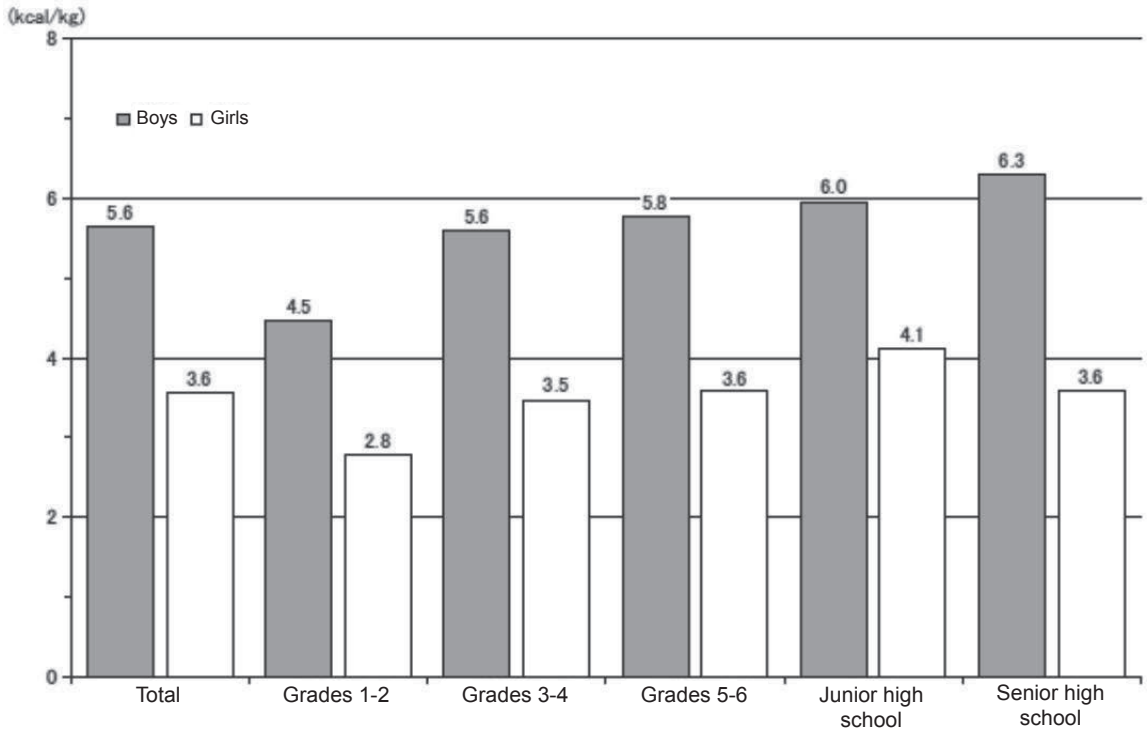


Figure 5-13-8 Average amount of energy consumption due to exercise per 1kg of body weight

The energy consumption due to exercise was 239kcal for boys and 142kcal for girls. In terms of school age, it was 108kcal for grades 1-2, 169kcal for grades 3-4, 218kcal for grades 5-6, 297kcal for junior high school, and 378kcal for senior high school boys. For girls, it was 65kcal for grades 1-2, 104kcal for grades 3-4, 136kcal for grades 5-6, 196kcal for junior high school, and 189kcal for senior high school girls. The amount of energy consumption tended to increase as school age advances in both boys and girls.

Compared to the FY2002 survey, the amount of energy consumption tended to be lower at all ages.

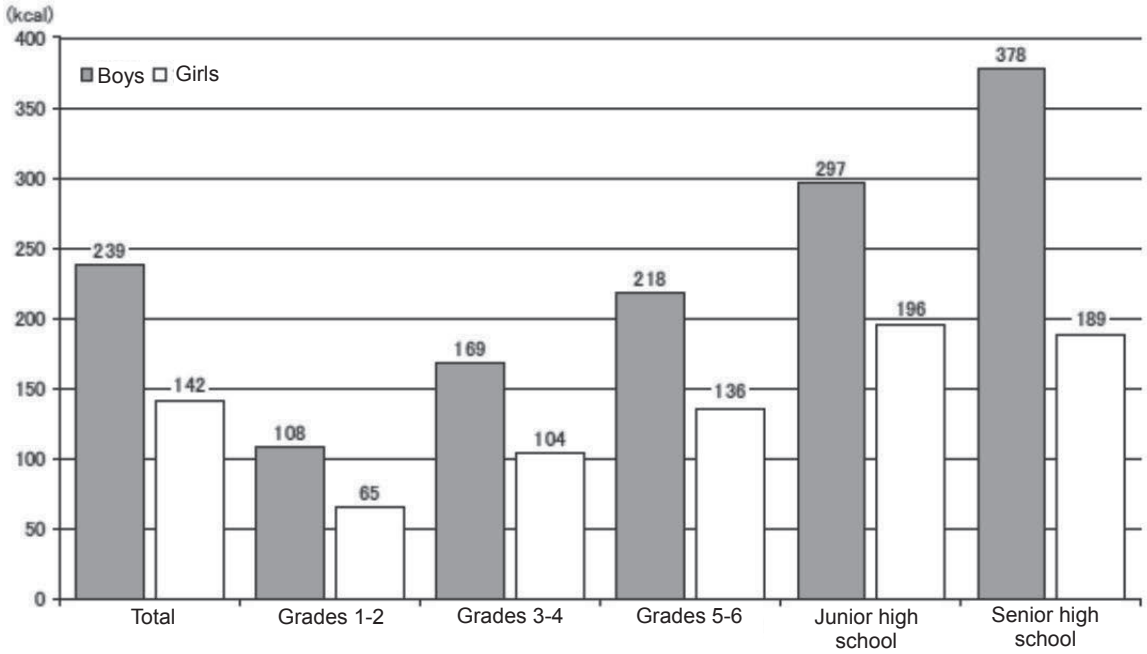


Figure 5-13-9 Average amount of energy consumption due to exercise

14 Activities of outside-of-school

Previous surveys have investigated the status of after-school, indoor activities; however, activities outside of school were investigated this time with the anticipation that children and students will use smartphones when commuting to school or they may go to tutoring schools or lessons after school without going home.

14.1 Time spent for reading or music appreciation

Starting from this survey, reading and music appreciation were separately investigated, and they were not limited to indoor activity at home after returning from school. As for reading, including books, newspapers, magazines, and *anime* comics, 80.6% of boys and 83.2% of girls were involved, spending 42 minutes in boys and 46 minutes in girls on average. The percentages have become higher, probably because *anime* comics were included from this survey. Those who listen to music and/or radio occupied 57.9% in boys and 69.4% in girls; boys spent 0:58 and girls spent 1:58 on average.

In terms of school age, 80-90% of both boys and girls are involved in reading from elementary school to junior high school ages but dropped to about 70% at senior high school. For music appreciation among boys, it varies from 30.2% to 46.8% among elementary school ages, and increases to 80.8% and 89.7% at junior and senior high schools, respectively. For girls, it varies from 37.3% to 66.6% among elementary school ages, and increases to 90.5% and 93.5% at junior and senior high schools, respectively.

The average time for reading was 0:28 and 0:28 for grades 1-2 boys and girls, 0:34 and 0:36 for grades 3-4 boys and girls, 0:39 and 0:47 for grades 5-6 boys and girls, respectively, showing a slight increase as school age advances. It was roughly 0:55 for both boys and girls of both junior and senior high schools.

The average time for music appreciation was 0:22 and 0:24 for grades 1-2 boys and girls, 0:25 and 0:30 for grades 3-4 boys and girls, 0:32 and 0:45 for grades 5-6 boys and girls, respectively, showing a slight increase as school age advances. It was roughly 1:20 for both boys and girls of both junior and senior high schools.

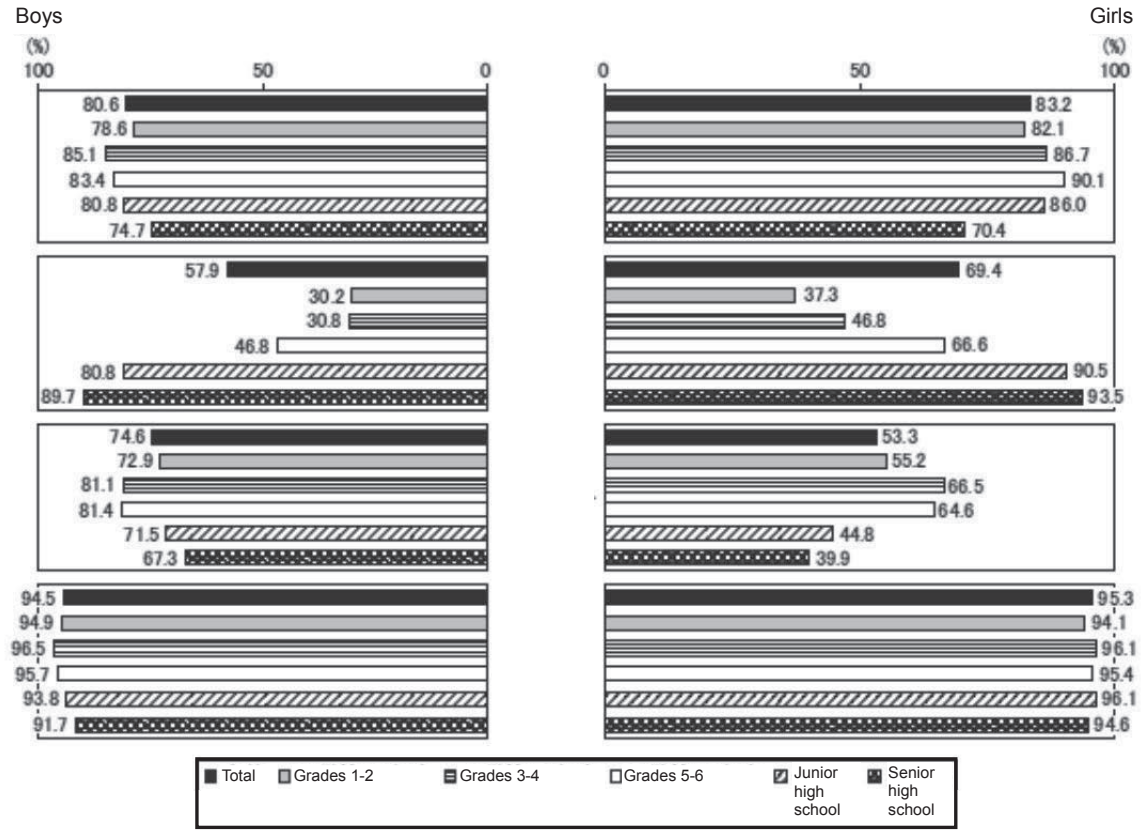


Figure 5-14-1 Proportion of time spent for activities of outside-of-school

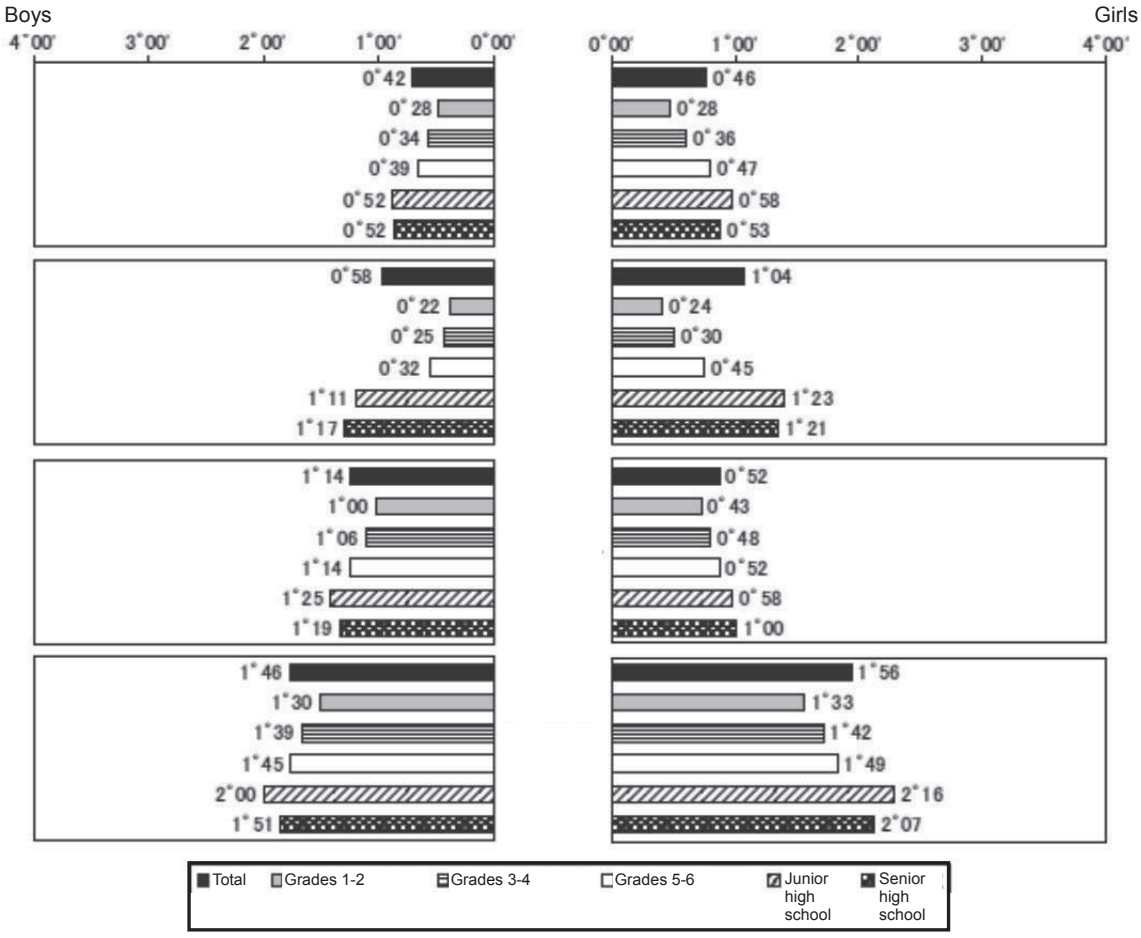


Figure 5-14-2 Average time spent for outside-of-school activities

14.2 Time spent playing games other than online games

Starting from this survey, time for online games were included in the Internet time, and the time for games refers to the time spent for games other than those online. Those who play games excluding online games accounted for 74.6% in boys and 53.3% in girls. When compared by school age and gender, for boys it increased during elementary school ages from 72.9% at grades 1-2 to 81.1% at grades 3-4 and 81.5% at grades 5-6, but it dropped to 71.5% at junior high school and 67.3% at senior high school. For girls, it varied from 55 to 65% among elementary school ages from grades 1 to 6 and drops to 44.8% at junior high school and 39.9% at senior high school.

The average time of those who answered yes was 1:14 for boys and 0:52 for girls, suggesting that boys tend to spending more than girls. When compared by school age and gender, it was roughly 1:00 to 1:15 for elementary school boys and about 1:20 for junior and senior high school boys, whereas it was roughly 0:45 to 0:50 for elementary school girls and about 1:00 for junior and senior high school girls.

14.3 Time spent watching a television, video, or DVD

Those who watch a television, video, or DVD was 94.5% in boys and 95.3% in girls, and over 90% of both boys and girls watch across all school ages.

Of those who answered yes to watching a television, video or DVD, the average time was 1:46 for boys and 1:56 for girls. When compared across school age and gender, it was roughly 1:30 to 1:45 for elementary school children and 2:00 to 2:15 for junior and senior high school students for both boys and girls.

14.4 Time spent using the Internet

Starting from this survey, the use of the Internet via mobile phones and smartphones or tablet and personal computers was separately investigated. Mobile phone and smartphone users accounted for 43.0% in boys and 47.9% in girls. When compared across school age and gender, the percentages of the users is roughly 20% in grades 1-2, 25% in grades 3-4, and 30% in grades 5-6 children, but the percentage rapidly increases at junior and senior high schools to 50.4% and 59.3% at junior high school boys and girls and 93.7% and 94.8% at senior high school boys and girls, respectively; girls tended to be higher than boys.

The average time spent on mobile phones and smartphones was 1:43 for boys and 1:48 for girls; when compared by school age and gender, it was 0:30 to 0:40 at elementary school but became longer for junior and senior high schools, reaching 1:53 and 1:57 for junior high school boys and girls and 2:26 and 2:37 for senior high school boys and girls, respectively.

The tablet and computer users accounted for 35.8% in boys and 32.9% in girls. When compared by school age and gender, the percentages of the users were roughly 20% in grades 1-2, 30% in grades 3-4, and 40% in grades 5-6 children; it then increases at junior high school to 49:7% for boys and 48.2% for girls and drops at senior high school to 34.6% for boys and 25.4% for girls. The average time spent on tablets and computers was 1:12 for boys and 1:04 for girls; when compared by school age and gender, it was 0:40 to 0:50 for elementary school children, 1:31 for boys and 1:24 for girls at junior high school, and 1:36 for boys and 1:16 for girls at senior high school.

As for what they use their mobile phones, smartphones, tablets, or computers for, 66.3% of boys and 66.5% of girls watch videos, 55.9% of boys and 38.9% of girls play online games, 27.9% of boys and 35.3% of girls read news articles, 37.9% of boys and 51.8% of girls do the social networking service (SNS) and e-mails, and 23.4% of boys and 26.9% of girls uses their devices for making calls. When compared by school age and gender, neither gender nor school age made no different for watching videos, and playing online games showed little change in terms of school ages although boys were more frequently involved than girls. The SNS and e-mail occupied small percentages among elementary school children but was 45.3% and 64.4% for junior high school boys and girls and 75.7% and 88.4% for senior high school boys and girls, respectively, indicating that girls were more often involved than boys. The same trend was also observed for making calls, although the percentages were not as high. The average time spent was 0:53 in boys and 0:48 in girls for watching videos, 1:00 in boys and 0:40 in girls for online games, 0:38 in boys and 0:42 in girls for reading news articles, 0:55 and 1:18 for SNS and e-mails, and 0:44 in boys and 0:48 in girls for making calls.

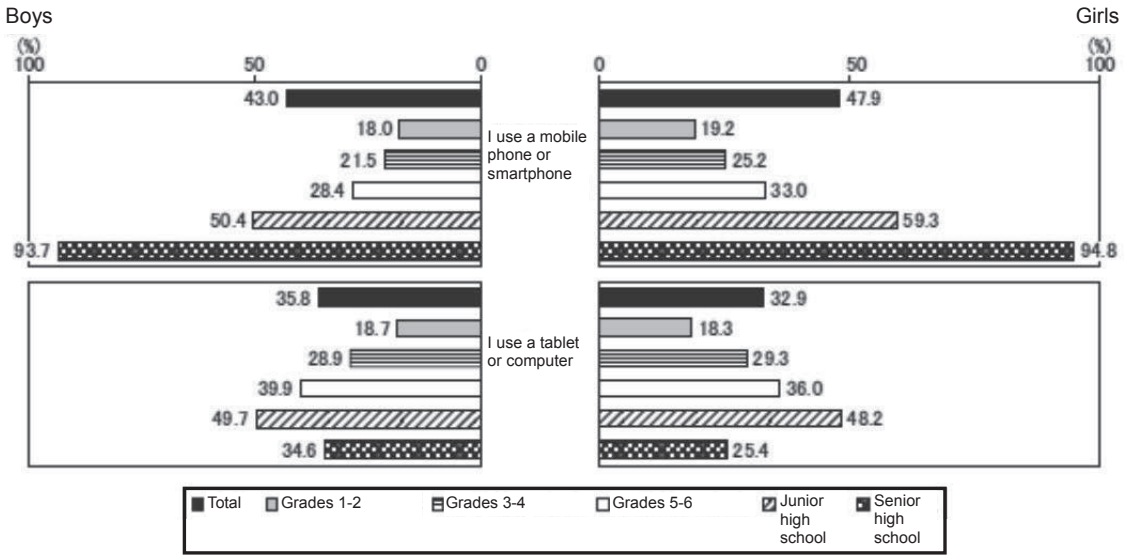


Figure 5-14-3 Percentages of mobile phone and smartphone users and tablet and computer users

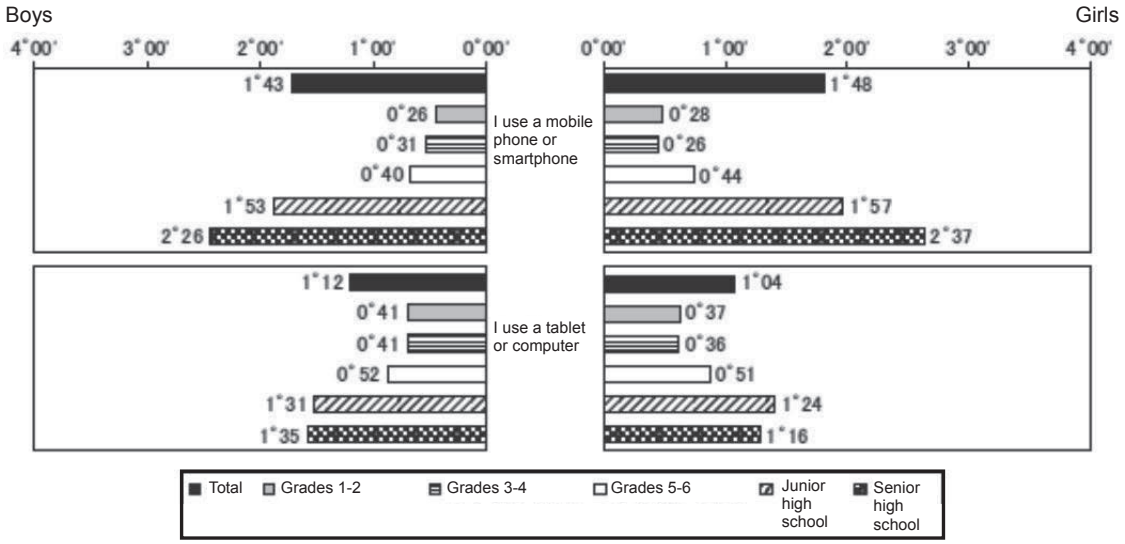


Figure 5-14-4 Average time spent on mobile phones and smartphones or tablets and computers

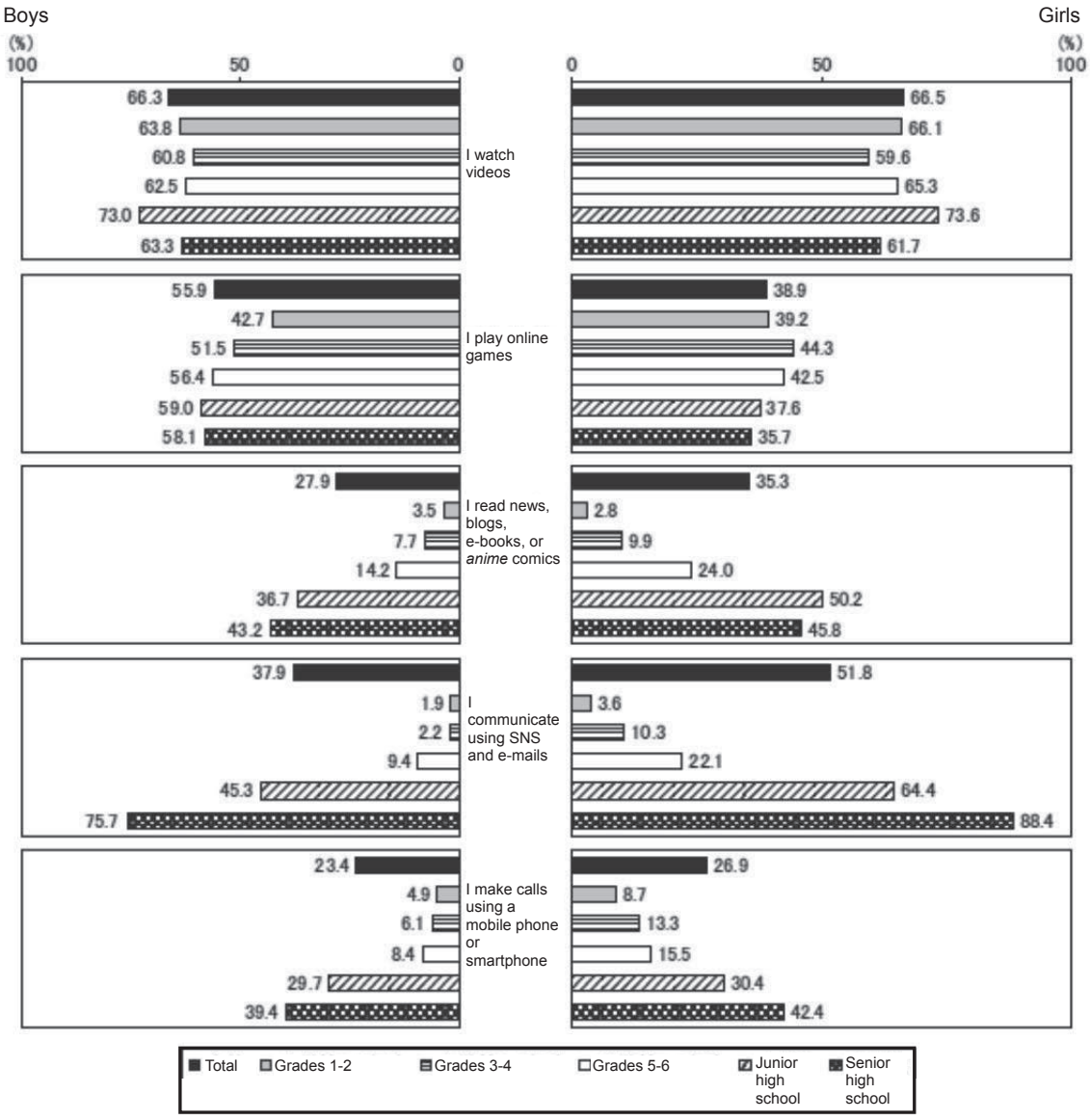


Figure 5-14-5 What mobile phones and smartphones or tablets and computers are used for

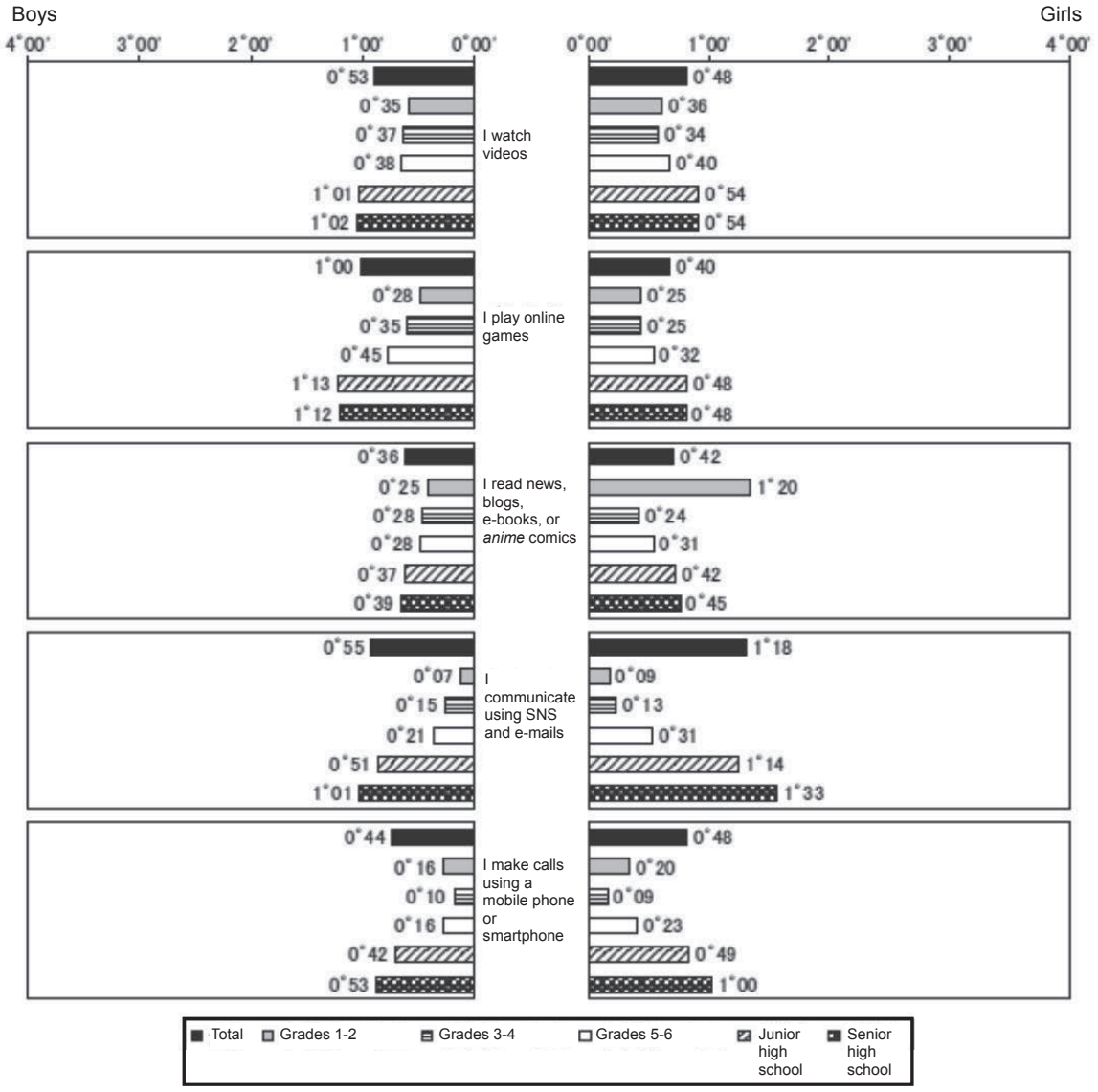


Figure 5-14-6 Average time spent on mobile phones and smartphones or tablets and computers based on what they are used for

14.5 Screen time

The game, Internet, and television times was totaled as the screen time. The average time spent when all these were combined was 5:55 for boys and 5:40 for girls. In terms of school age, the average time was 3:38 and 3:31 for grades 1-2 boys and girls, 3:58 and 3:33 for grade 3-4 boys and girls, 4:33 and 4:16 for grades 5-6 boys and girls, respectively. It became longer from junior high school, reaching 6:49 and 6:36 for junior high school boys and girls and 7:11 and 7:01 for senior high school boys and girls, respectively. The Internet time particularly increased among junior and senior high school students, which is likely correlated with the sudden decrease in exercise time.

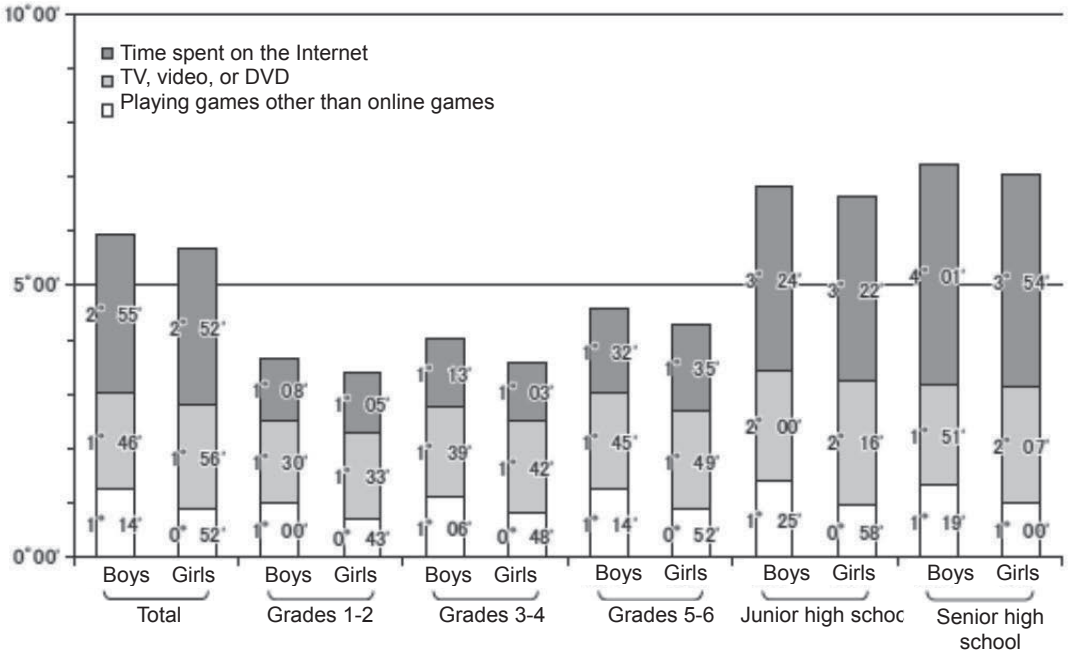


Figure 5-14-7 The average screen time

14.6 Distribution of the time for reading or music appreciation

The distribution of the time for reading (including *anime* comics) for boys showed that 21.4% at grades 1-2, roughly 15% at grades 3-6, and 20-25% at junior and senior high schools did not answer. Those who spend less than 1 hour accounted for 65.7% at grades 1-2, 65.4% at grades 3-4, 57.2% at grades 5-6, 44.2% at junior high school, and 38.7% at senior high school, showing a decrease as school age advanced. Those who spend 1 hour or longer accounted for 12.9% at grades 1-2, 19.8% at grades 3-4, 26.2% at grades 5-6, 36.7% at junior high school, and 36.0% at senior high school, showing an increasing trend as school age advanced.

For girls, those who are not involved in the activity (no answered) accounted for 17.9% at grades 1-2, 13.3% at grades 3-4, 9.9% at grades 5-6, 14.0% at junior high school, and 29.6% at senior high school. Those who spend less than 1 hour accounted for 70.4% in grades 1-2, 63.2% in grades 3-4, 54.3% in grades 5-6, 43.4% in junior high school, and 39.0% in senior high school, showing a decreasing trend as school age advanced. Those who spend 1 hour or longer accounted for 11.7% at grades 1-2, 23.6% at grades 3-4, 35.9% at grades 5-6, 42.7% at junior high school, and 31.3% at senior high school, showing an increasing trend as school age advanced. Both boys and girls in junior and senior high schools tended to show a shift to the right in distribution compared to elementary school grades, and about 10% of junior and senior high school students are spending as long as 2 hours or more.

The distribution of the time for music appreciation for boys showed that those not involved in the activity (no answer) decreased from roughly 70% at grades 1-4 to 53.2% at grades 5-6, 19.2% at junior high school, and 10.3% at senior high school. Those who spend less than 1 hour accounted for 27.5% at grades 1-2, 27.5% at grades 3-4, 36.8% at grades 5-6, 35.6% at junior high school, and 31.9% at senior high school. Those who spend 1 hour or longer accounted for 2.6% at grades 1-2, 3.2% at grades 3-4, 10.2% at grades 5-6, 45.1% at junior high school, and 57.8% at senior high school, showing a rapidly increasing trend after entering junior high school.

For girls, those who are not involved in the activity (no answer) accounted for 62.7% at grades 1-2, 53.2% at grades 3-4, 33.4% at grades 5-6, 9.5% at junior high school, and 6.5% at senior high school. Those who spend less than 1 hour accounted for 33.5% at grades 1-2, 39.9% at grades 3-4, 44.6% at grades 5-6, 33.9% at junior high school, and 32.3% at senior high school. Those who spend 1 hour or longer accounted for 3.8% at grades 1-2, 6.9% at grades 3-4, 12.1% at grades 5-6, 56.5% at junior high school, and 61.2% at senior high school, showing a rapidly increasing trend after entering junior high school. Of those who spend 1 hour or longer, 18.3% of junior high school boys, 24.1% of senior high school boys, and about 27% of junior and senior high school girls spent 2 hours or longer.

Both boys and girls in junior and senior high schools tended to show a shift to the right in

distribution compared to elementary school grades.

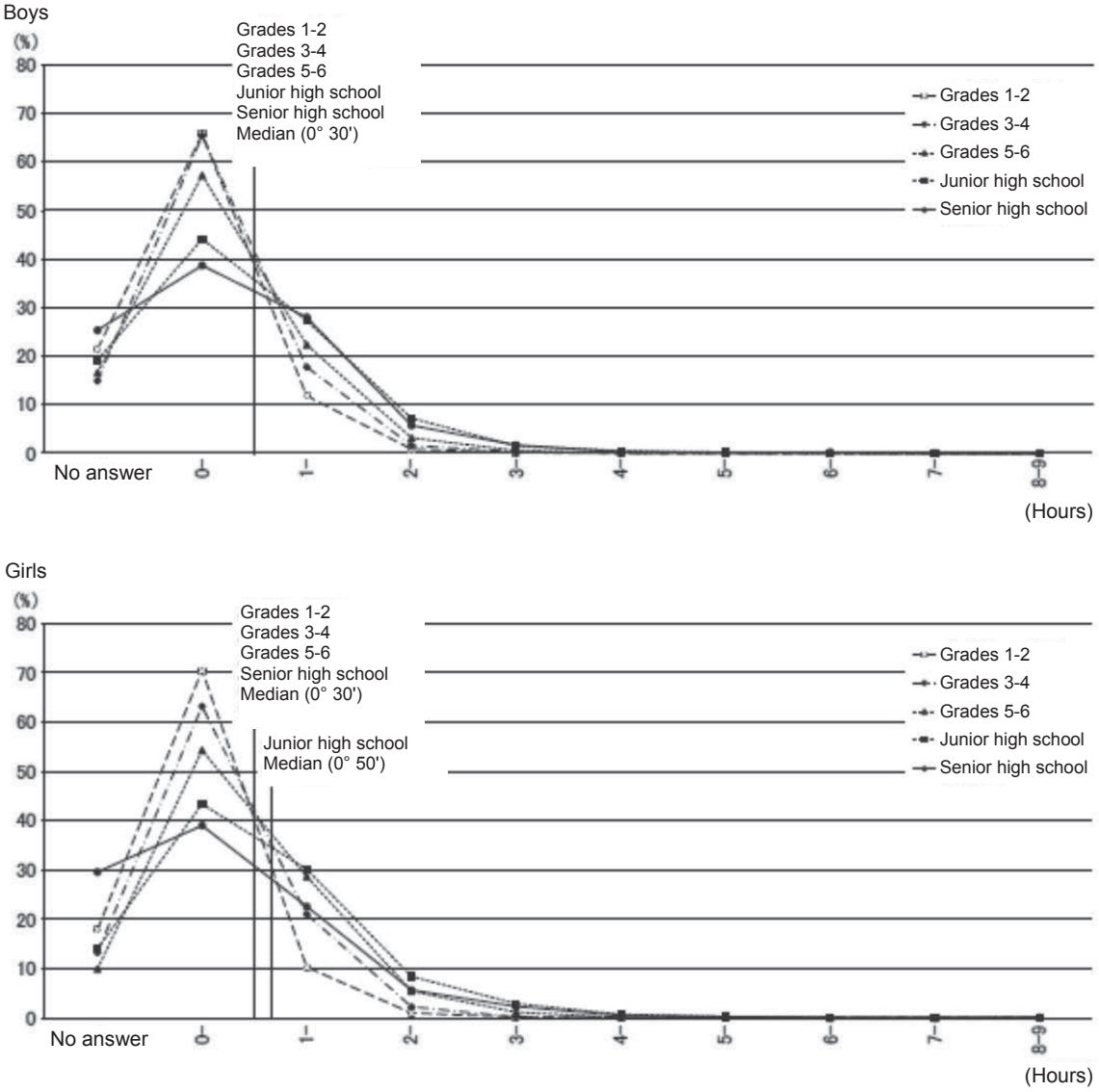


Figure 5-14-8 Distribution of the time spent for reading books, newspapers, magazines, or *anime* comics

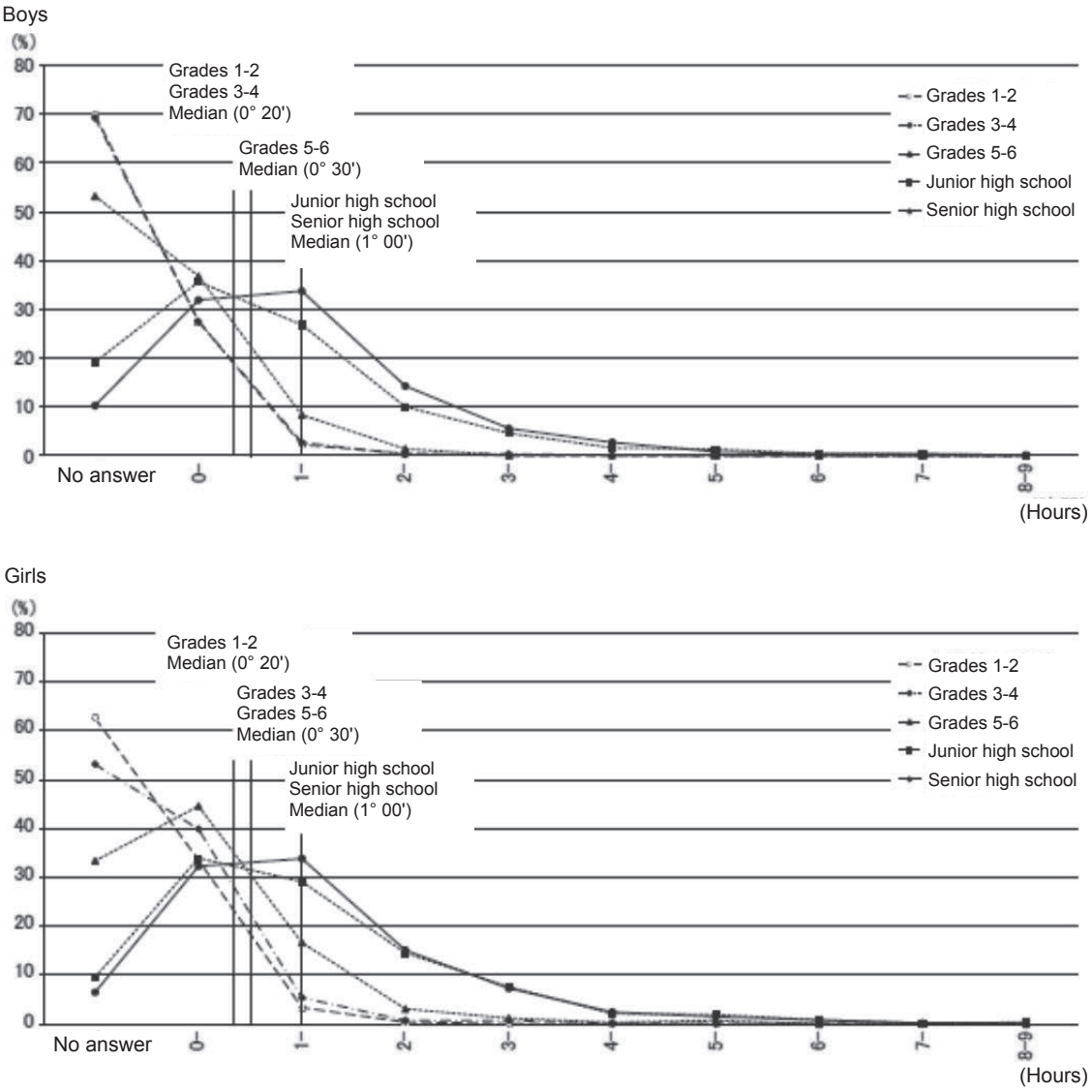


Figure 5-14-9 Distribution of the time for music appreciation

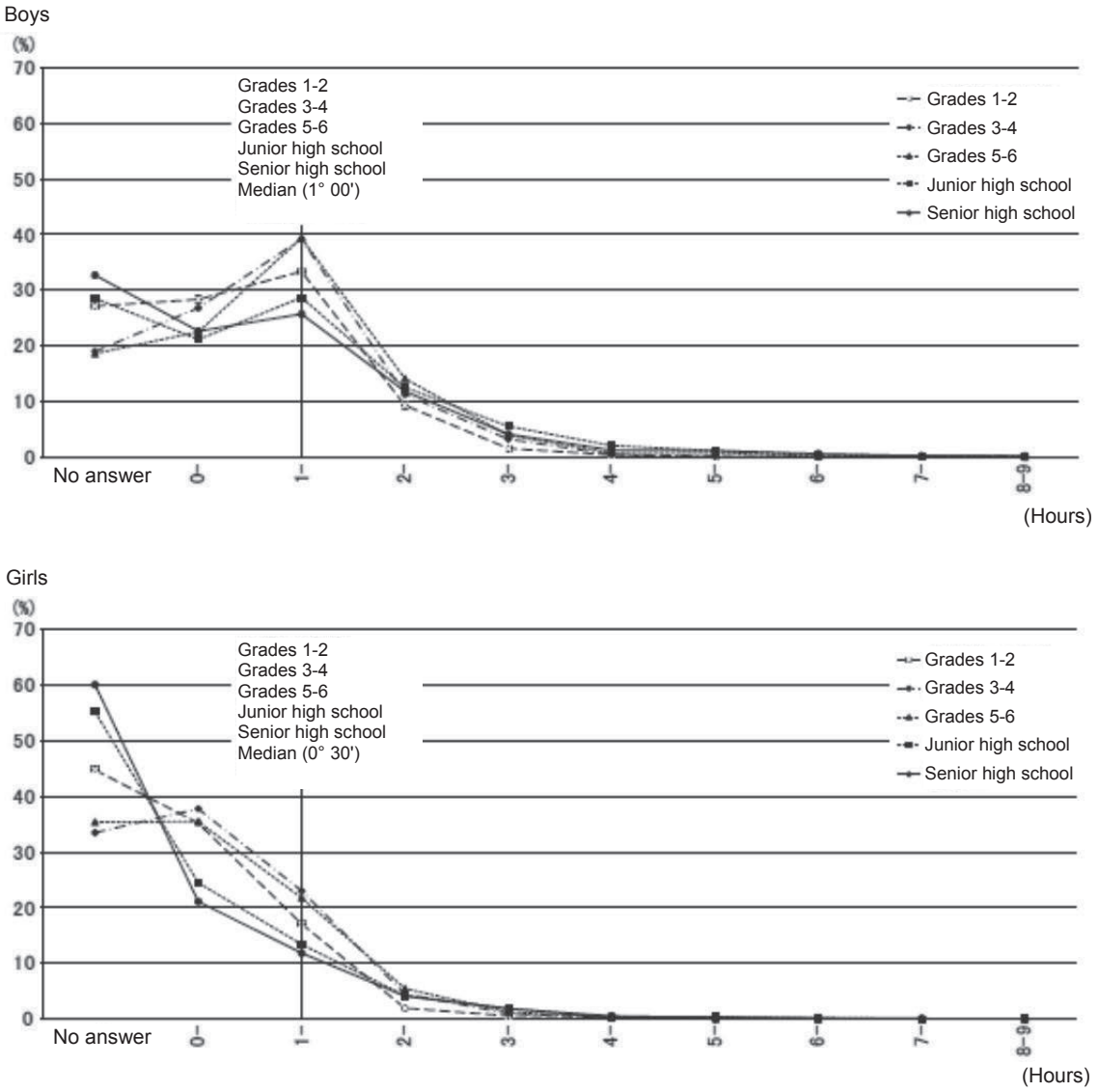


Figure 5-14-10 Distribution of the time spent playing games other than online games

14.7 Distribution of the time spent playing games other than online games

The distribution of the time for playing games was considerably different in shape between boys and girls and also among school age. For boys, those who are not involved in the activity (no answer) accounted for 27.1% at grades 1-2, 18.9% at grades 3-4, 18.6% at grades 5-6, 28.5% at junior high school, and 32.7% at senior high school, showing an increase at junior and senior high schools; those who spend less than 1 hour was 28.3% at grades 1-2, 26.8% at grades 3-4, 22.5% at grades 5-6, 21.1% at junior high school, and 22.6% at senior high school; and those who spend 1 to 2 hours was 33.4% at grades 1-2, 39.2% at grades 3-4, 39.3% at grades 5-6, 28.6% at junior high school, and 25.7% at senior high school, showing a slightly decreasing trend at junior and senior high schools.

For girls, those who are not involved in the activity (no answer) accounted for 44.8% at grades 1-2, 33.5% at grades 3-4, 35.4% at grades 5-6, 55.2% at junior high school, and 60.1% at senior high school, showing an increase at junior and senior high schools; those who spend less than 1 hour was roughly 35% at elementary school grades, 24.5% at junior high school, and 21.1% at senior high school; and those who spend 1 to 2 hours was 17-23% at elementary school grades, 13.4% at junior high school, and 11.1% at senior high school, showing a decreasing trend at junior and senior high schools. Those who spend 2 hours or longer in boys accounted for 14.3% at grades 1-2, 15.1% at grades 3-4, 19.8% at grades 5-6, 21.6% at junior high school, and 19.0% at senior high school. For girls, it ranged from 3.0% to 7.5%.

14.8 Distribution of the time spent watching a television, video, or DVD

In the distribution of the time spent watching a television, video, or DVD, 1 to 2 hours occupied the highest percentage at 37.3% in boys and 33.2% in girls, followed by 2 to 3 hours. 1 to 3 hours accounted for 63.7% in boys and 61.6% in girls, occupying over 60% overall. Those who spend 3 hours or longer was 17.8% of boys and 22.0% of girls.

When compared by school age and gender, 1 hour or longer but less than 2 hours was the most common answer across all school ages; it ranged from about 45% at grades 1-2 children to 30% at senior high school students, showing a decrease as school age advanced. Those who watch 3 hours or longer accounted for 24.9% and 32.1% in junior high school boys and girls, respectively, and 22% in both boys and girls at senior high school. The data of junior high school students were distributed over a wider range compared to other school ages, and junior high school students showed a tendency of spending longer time watching a television, video, or DVD.

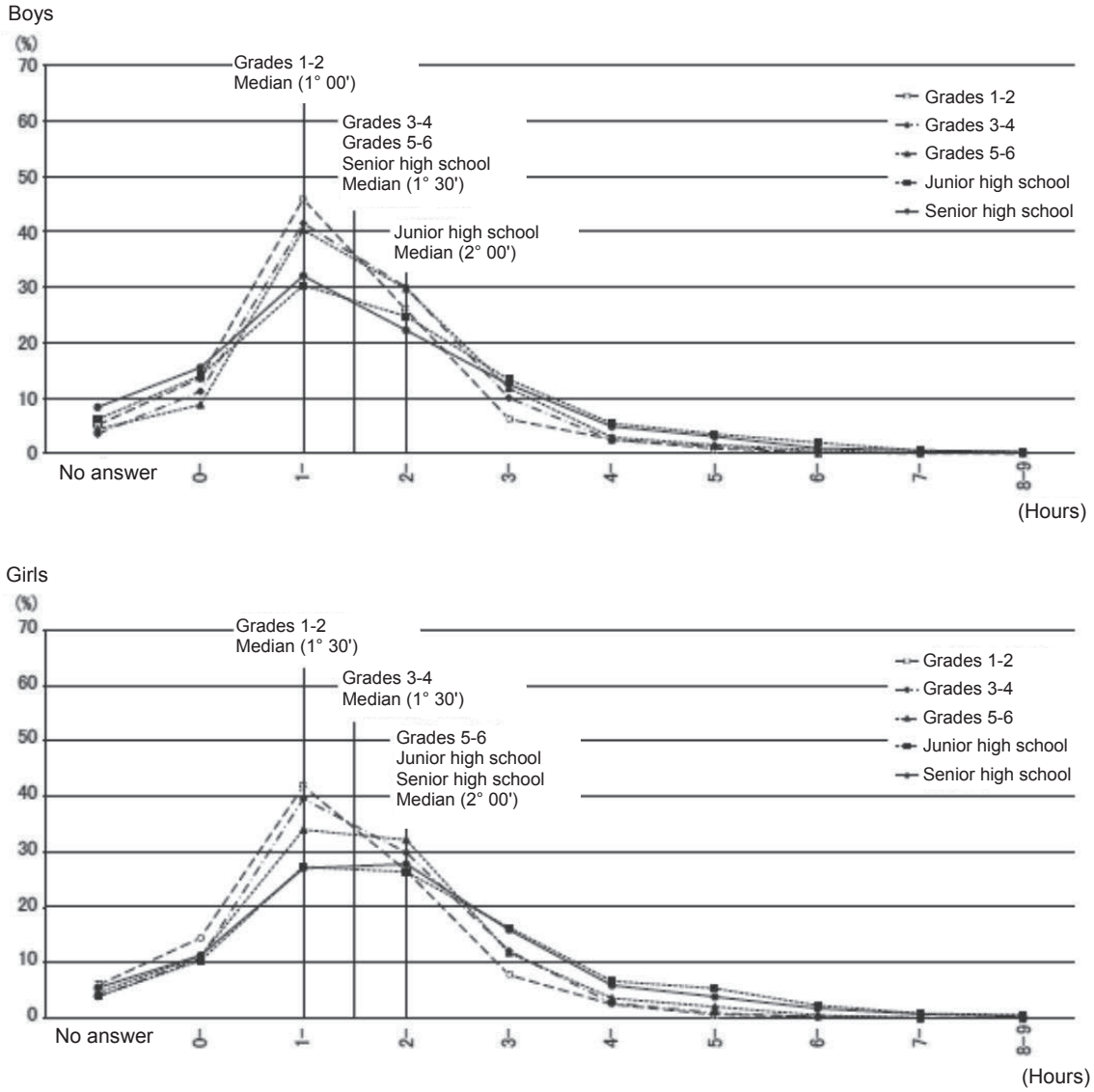


Figure 5-14-11 Distribution of the time spent watching a television, video, or DVD

14.9 Distribution of the time using the Internet

In the distribution of the time spent using the Internet, those who are not involved in the activity (no answer) was about 80% in both boys and girls at grades 1-2, 75% at grades 3-4, and 70% at grades 5-6, suggesting that the use of the Internet is not common among elementary school children, but it rapidly decreased from junior high school to senior high school ages to 49.6% and 40.7% in junior high school boys and girls and 6.3% and 5.2% in senior high school boys and girls, respectively. Those who spend less than 1 hour accounted for 12.9% and 17.6% in junior high school boys and girls and 9.8% and 9.1% in senior high school boys and girls; those who spend 1 to 2 hours was 14.9% and 15.0% in junior high school boys and girls and 25.0% and 20.4% in senior high school boys and girls; and those who spend 2 hours or longer was 23.0% and 26.8% in junior high school boys and girls and 35.6% and 42.1% in senior high school boys and girls; respectively. As shown above, senior high school students spend longer time on the Internet, and this trend was particularly marked in girls.

In the distribution of the time spent using a tablet or personal computer, those who are not involved in the activity (no answer) was about 80% in both boys and girls at grades 1-2 and about 70% at grades 3-4, which suggest that using a tablet or computer is not common among them; it accounts for about 60% at grades 5-6, 50% at junior high school, and 65.4% and 74.6% in boys and girls at senior high school, suggesting that even senior high school students do not use a tablet or personal computer too often. Those who spend less than 1 hour ranged from 12.6% to 22.0% in elementary school boys and girls with an increasing trend in higher grades, and it was 16.8% and 18.1% in junior high school boys and girls and 11.8% and 10.0% in senior high school boys and girls; those who spend 1 to 2 hours was 16.2% and 15.5% in junior high school boys and girls and 11.4% and 9.0% in senior high school boys and girls; and those who spend 2 hours or longer was 16.9% and 14.4% in junior high school boys and girls and 11.4% and 6.4% in senior high school boys and girls; respectively. As shown above, the number of the tablet or personal computer users is less than that of the mobile phone or smartphone users, and a few of them spend long hours, especially not among girls.

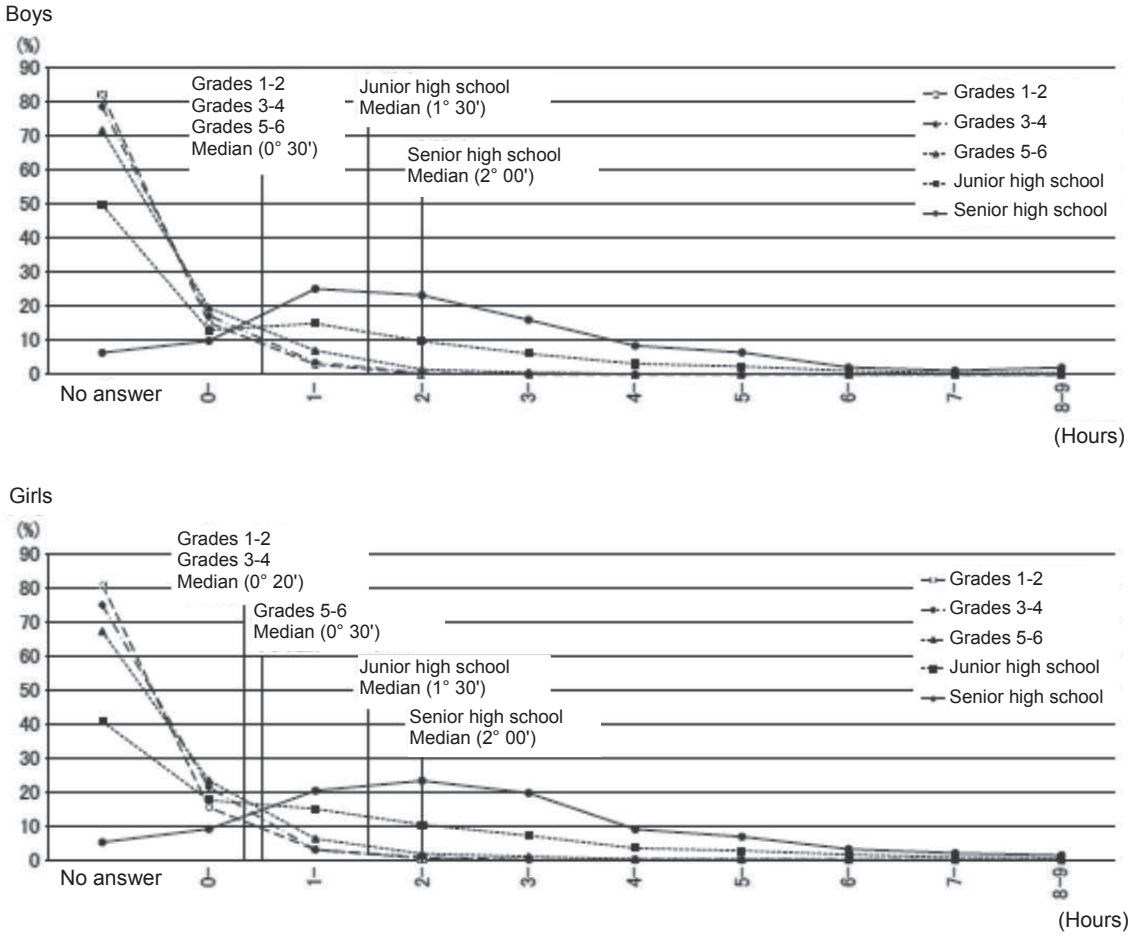


Figure 5-14-12 Distribution of the time spent using a mobile phone or smartphone

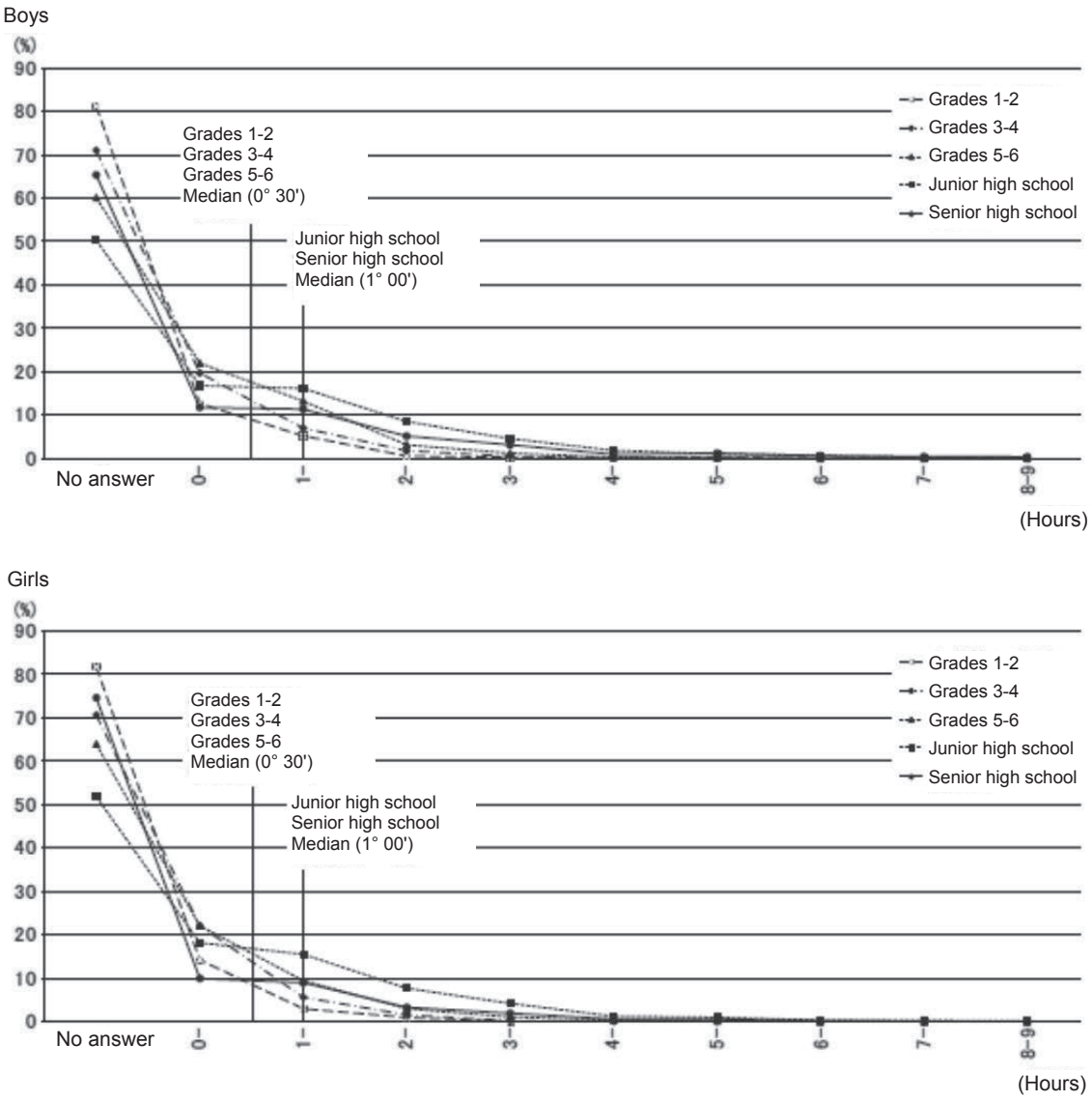


Figure 5-14-13 Distribution of the time spent using a tablet or personal computer

15 Experience of having used the social networking service (SNS)

15.1 Experience of having used the social networking service (SNS)

Those who have used the social networking service (SNS) accounted for 30.7% in boys and 36.8% in girls, whereas 32.6% of boys and 30.2% of girls never have. Moreover, 35.0% of boys and 31.0% of girls did not know about SNS. In terms of school age up to 10% or so have used SNS among the grades 1-4 children, reaching 13.8% and 19.4% in grades 5-6 boys and girls, 43.1% and 51.4% in junior high school boys and girls, and 78.0% and 86.0% in senior high school boys and girls, respectively. Those who do not know about SNS accounted for roughly 50-60% in grades 1-4 children, about 35% in both boys and girls at grades 5-6, 25.1% and 17.1% in junior high school boys and girls, and 7.1% and 5.1% in senior high school boys and girls, respectively, suggesting a decreasing trend as school age advances. About 35 to 45% of elementary school children have never used SNS, but it drops to 25-30% at junior high school and 10-15% at senior high school.

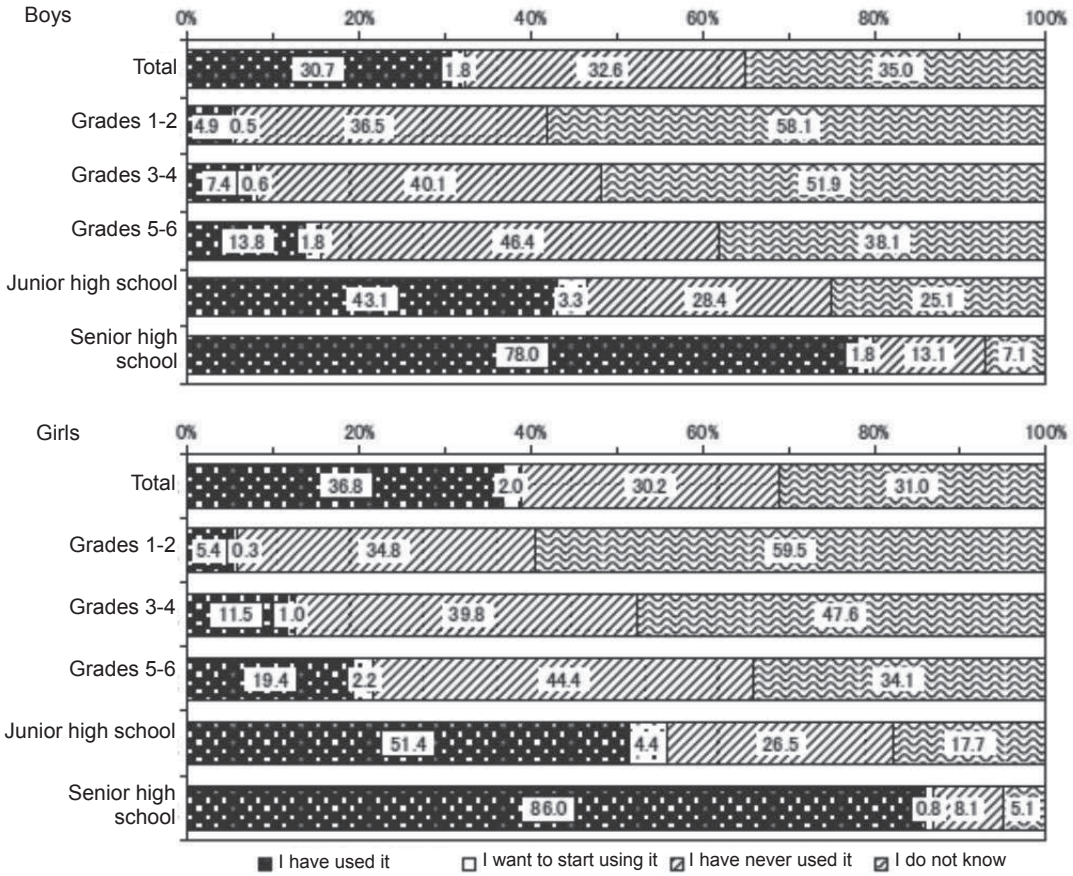


Figure 5-15-1 Experience of having used the social networking service (SNS)

15.2 Details of the use of the social networking service (SNS)

(Only those who answered that "I have used it [SNS]" in the previous question answered this question.)

Of those who have used SNS, 67.1% of boys and 48.7% of girls have used it to play online games, and 51.2% of boys and 64.1% of girls have used it to post one's opinions or things about daily life. In addition, 12.9% of boys and 8.7% of girls have played for the SNS services, and 20.1% of boys and 27.0% of girls have contacted a stranger through SNS.

When compared by gender and school age, those who have played online games accounted for 60.7% in boys and 47.3% in girls at grades 1-2, about 75-80% for grades 3-6 and junior high school boys, 58.9% in senior high school boys, 59.2% in grades 3-4 girls, 65.3% in grade 5-6 girls, 51.3% in junior high school girls, and 42.0% in senior high school girls. Those who have posted their opinions or things about daily life in boys was 16.8% at grades 1-2, 11.5% at grades 3-4, 21.4% at grades 5-6, 48.3% at junior high school, and 65.0% at senior high school; for girls, it was 22.8% at grades 1-2, 30.4% at grades 3-4, 37.6% at

grades 5-6, 60.9% at junior high school, and 79.4% at senior high school. There were hardly any elementary school children who have contacted a stranger in both boys and girls; however, 20.6% of boys and 30.4% of girls at junior high school and 25.4% of boys and 33.6% of girls at senior high school have. Those who have paid for the SNS services occupied up to 5% in elementary school boys and girls; however, 16.1% of boys and 9.0% of girls at junior high school and 13.4% of boys and 10.9% of girls at senior high school have.

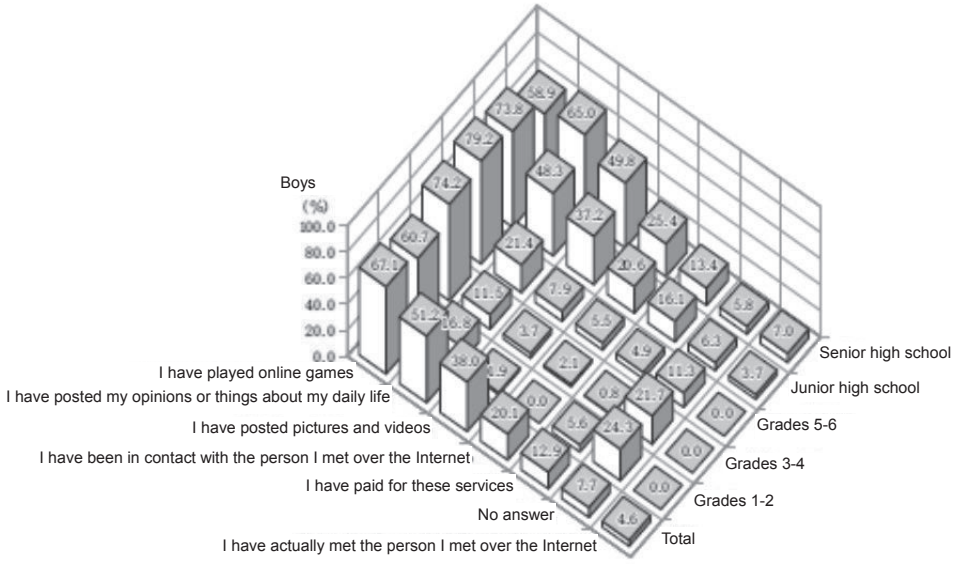


Figure 5-12-2 Details of the use of the social networking service (SNS) (in boys)
(Only those who answered that “I have used it [SNS]” in the previous question answered this question.)

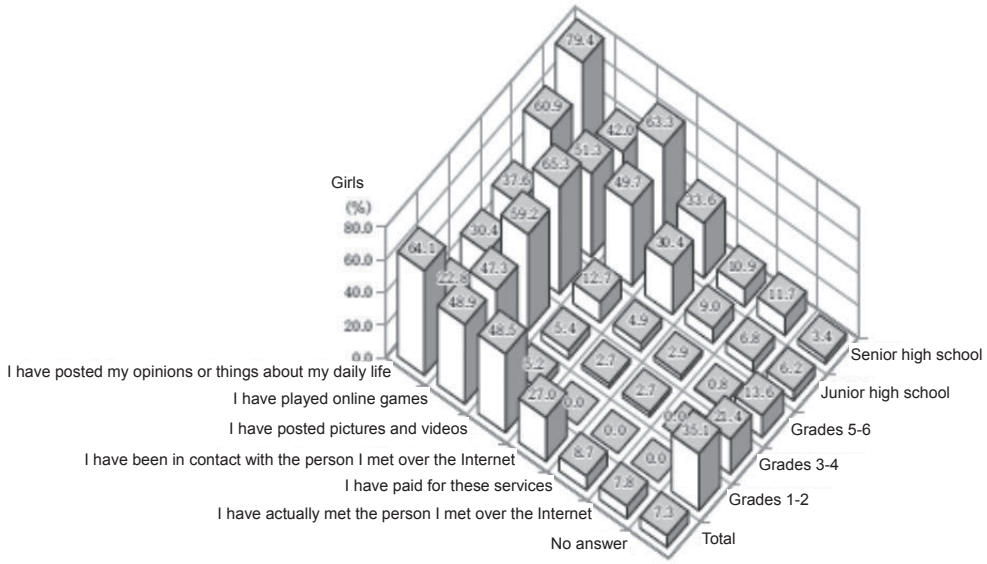


Figure 5-12-2 Details of the use of the social networking service (SNS) (in girls)
(Only those who answered that “I have used it [SNS]” in the previous question answered this question.)

15.3 Awareness of the family about using SNS

(Only those who answered that "I have used it [SNS]" in the previous question answered this question.)

Among the SNS users, 88.5% of boys and 92.5% of girls answered that their families know about them using SNS. In terms of school age, only a small number of grades 1-2 boys and girls are the users, but almost 100% of their families are aware of it. The number of users rapidly increases from junior high school and up, but the percentage of those whose families know slightly decreases among junior high school students at 90.7% in boys and 92.8% in girls and again slightly decreases among senior high school students at 83.3% in boys and 90.0% in girls.

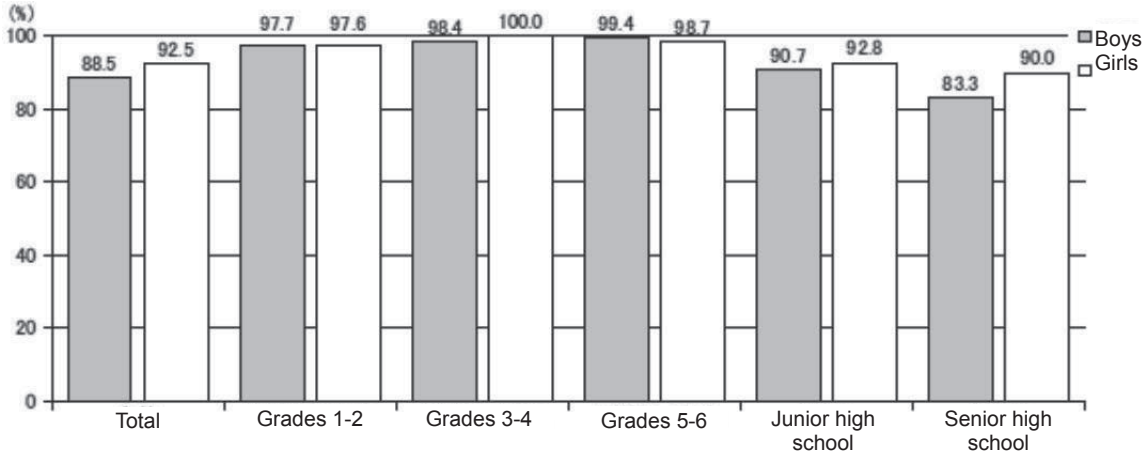


Figure 5-15-3 The percentage of your family who know about you using SNS (Only those who answered that "I have used it [SNS]" in the previous question answered this question.)

15.4 Internet troubles

Those who have experienced troubles relating to the Internet accounted for 2.6% in boys and 4.2% in girls, and the majority were junior and senior high school students. The troubles included fictitious billing and one-click fraud in 40.5% of boys and 16.3% of girls, chain mail in 39.7% boys and 61.9% girls, slander in 11.6% boys and 26.5% girls, and personal information leakage in 8.8% boys and 10.9% girls.

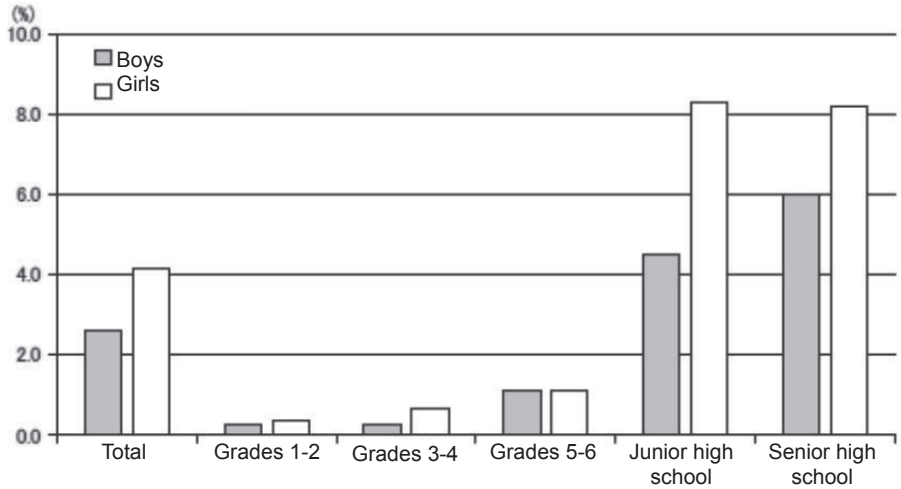


Figure 5-15-4 Frequency of Internet troubles

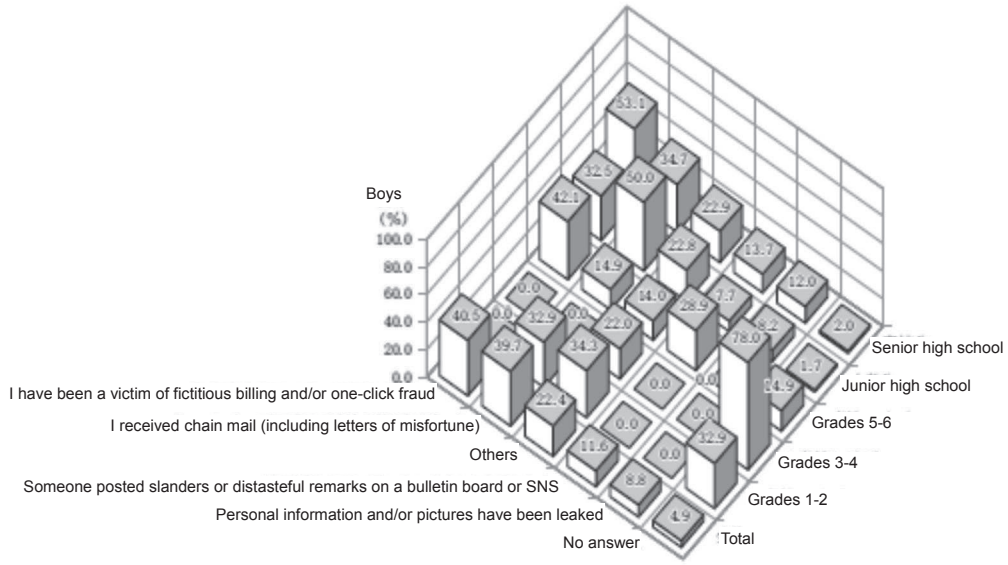


Figure 5-15-5 Details of Internet troubles (in boys)
(Only those who answered “Yes” for having experienced Internet troubles answered this question.)

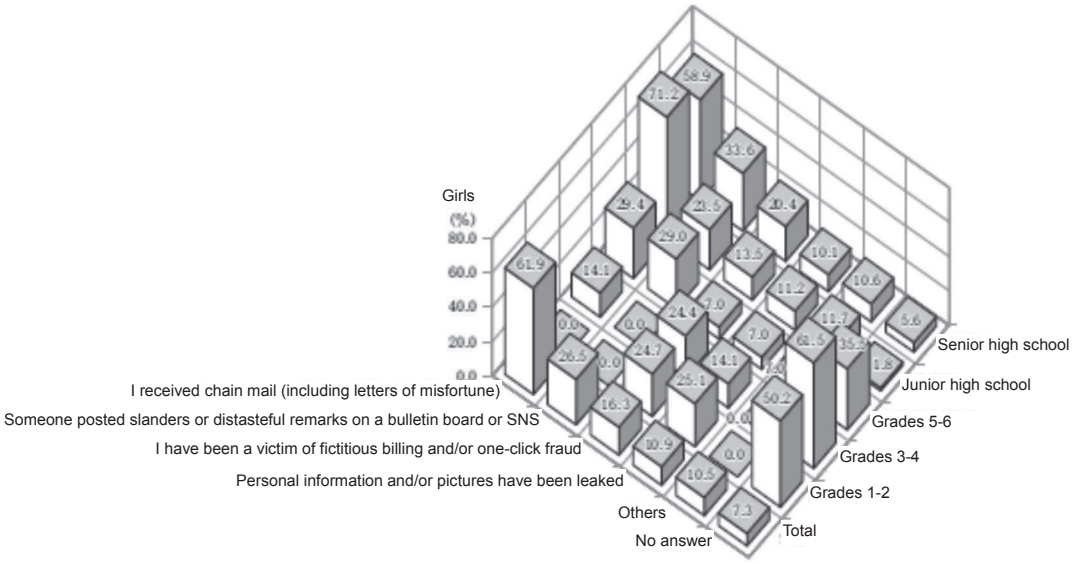


Figure 5-15-6 Details of Internet troubles (in girls)
(Only those who answered “Yes” for having experienced Internet troubles answered this question.)

16 Time spent studying at home after returning from school

16.1 Time spent studying at home

Those who study at home was 90.6% in boys and 92.6% in girls. When compared by school age and gender, over 90% of elementary school children and junior high school students study at home in both boys and girls. The percentage decreases among senior high school students to 74.6% in boys and 80.9% in girls.

The average time spent studying at home was 1:07 for boys and 1:15 for girls. When compared by school age and gender, it was 0:40 in boys and 0:42 in girls at grades 1-2 but 0:53 in boys and 1:05 in girls at grades 5-6. It was 1:40 and 1:54 for junior high school boys and girls, and 1:16 and 1:18 for senior high school boys and girls, respectively.

Compared to the last survey, it decreased by about 50 minutes for high school students, but it remained about the same for other school ages.

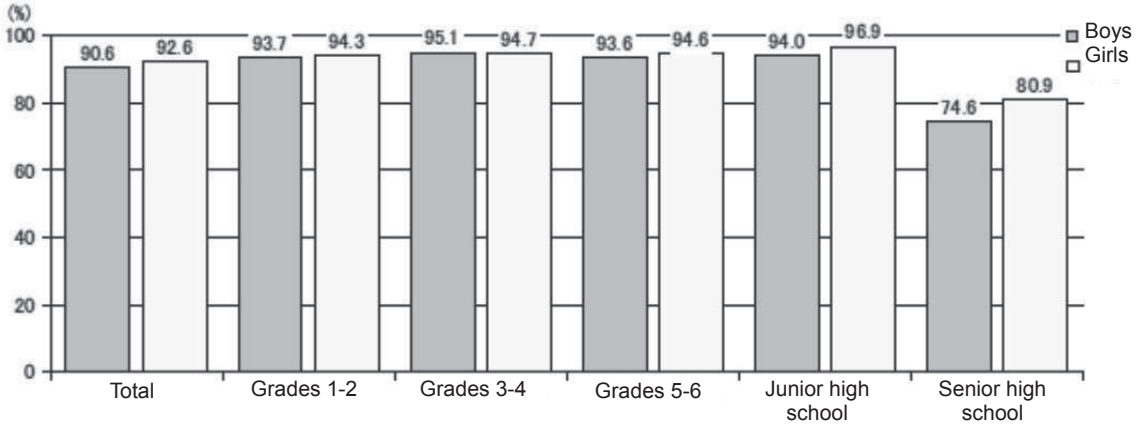


Figure 5-16-1 Number of people who studied at home after returning from school on the day before the survey day

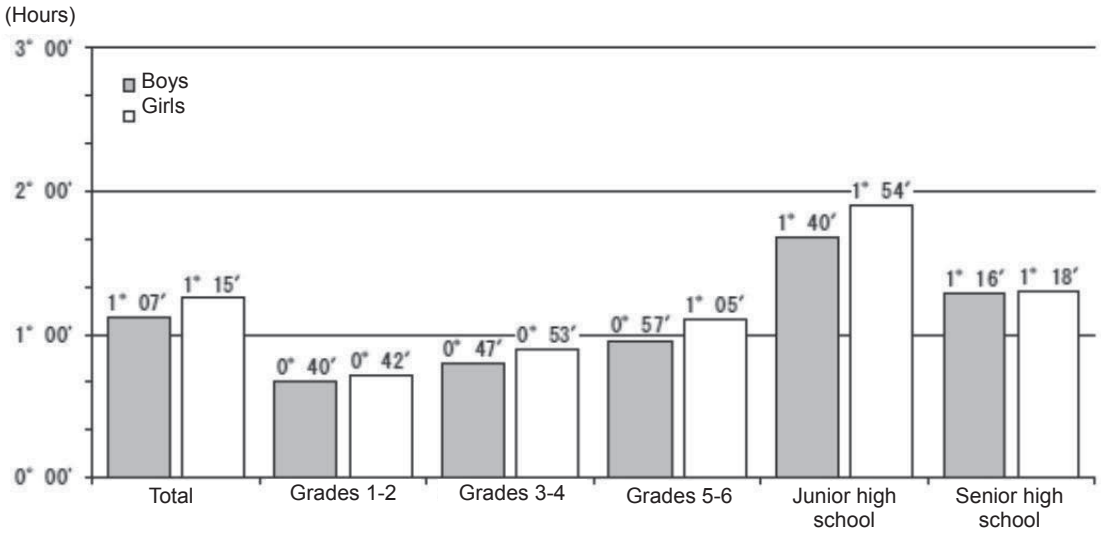


Figure 5-16-2 Average time spent studying at home after returning from school on the day before the survey day

16.2 Distribution of the time spent studying at home

The distribution of the time spent studying at home shows that less than 1 hour was most common among elementary school children, occupying as much as roughly 70% in grades 1-2. More children in grades 3-6 study for 1 to 2 hours, occupying 35-40% in boys and 40-50% in girls. Many study 1 to 2 hours in junior high school at 30-32% in both boys and girls. Among senior high school students, 25.6% of boys and 20.1% of girls did not study at home and 21.9% of boys and 22.7% of girls studied for 1 to 2 hours. The difference between those who do not study and those who do became prominent at high school, and a bipolar distribution between the two was observed.

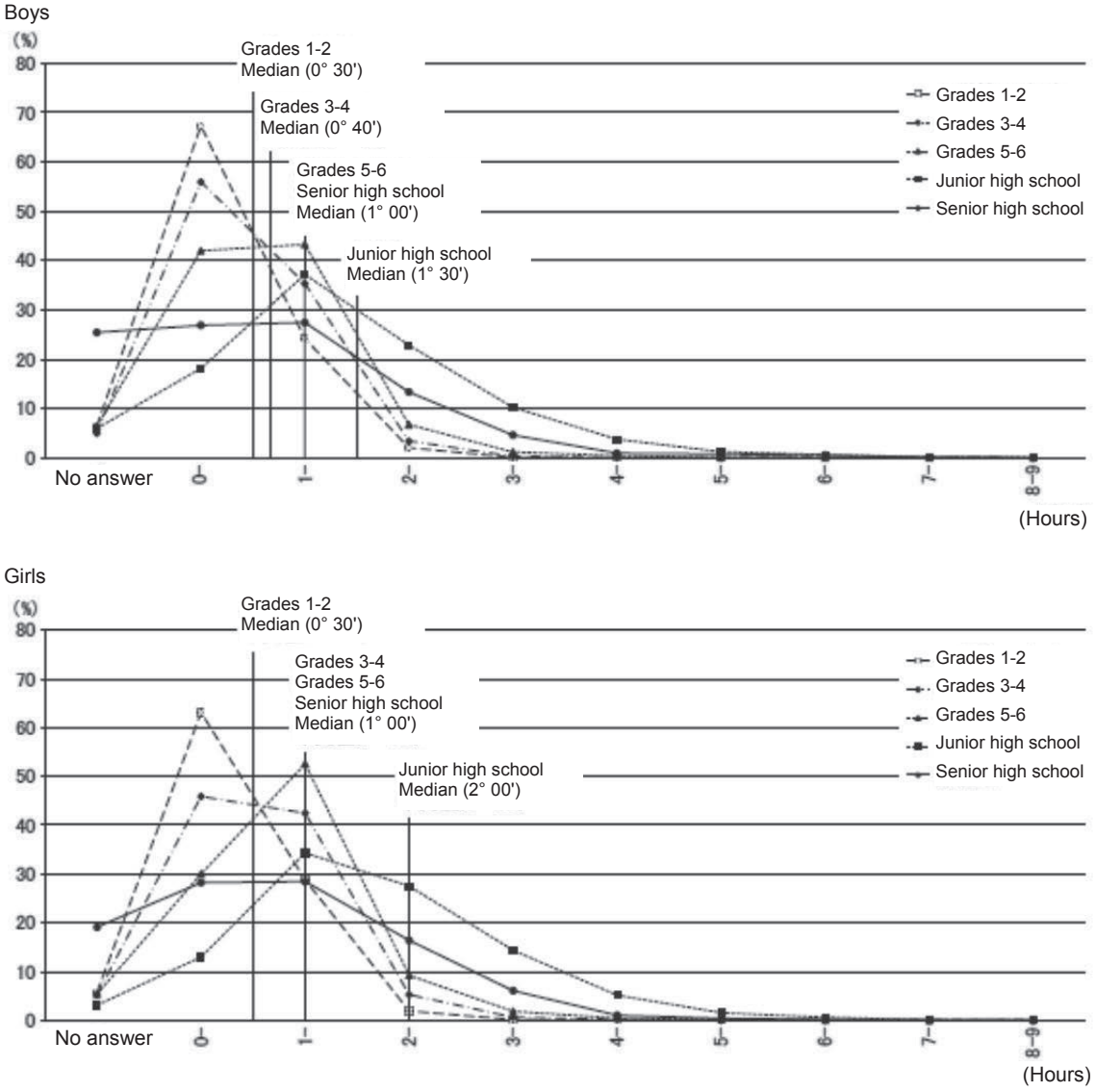


Figure 5-16-3 Distribution of the time spent studying at home

17 Attending tutoring school

17.1 Whether or not a child/student go to a tutoring school

The proportion of children who go to tutoring schools was 27.8% in boys and 27.5% in girls. In terms of school age, grades 1-2 was the lowest for both boys and girls, at 16.1% for boys and 17.1% for girls. This figure gradually increases as the school age advances and reaches a peak at junior high school children at 45.0% in boys and 45.3% in girls; it then decreases to 16.0% in boys and 13.7% in girls in senior high schools. Compared to the last survey, a decrease in high school students was remarkable.

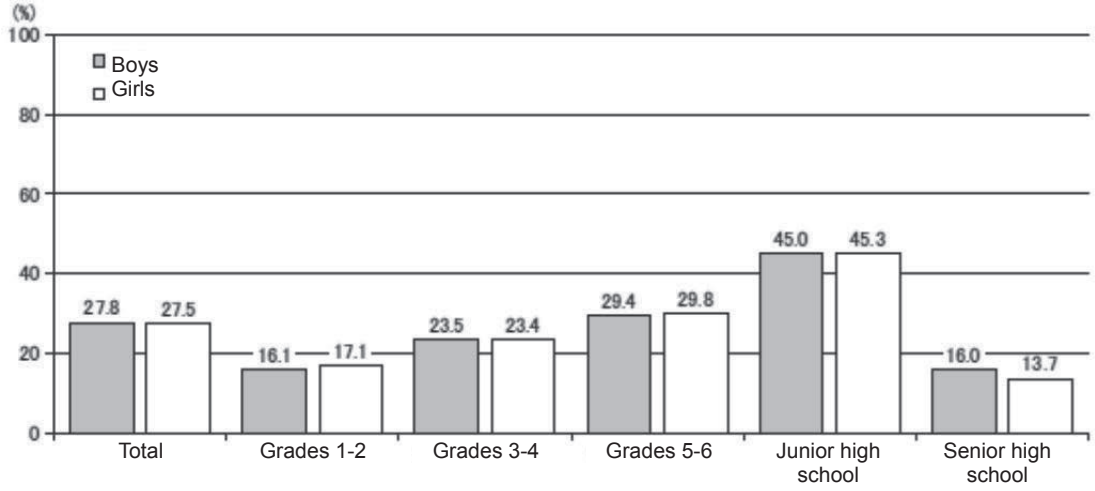


Figure 5-17-1 Proportion of those who go to tutoring schools

17.2 Number of times of going to tutoring schools in a week

(Only those who answered "I go to a tutoring school" in the previous question answered this question.)

Overall, the number of times of going to tutoring schools in a week was 2.2 in both boys and girls. When compared by school age and gender, the frequency increased but only slightly until junior high school as school age advanced, and then there was a decreasing trend for senior high school. The results were almost the same as the last survey.

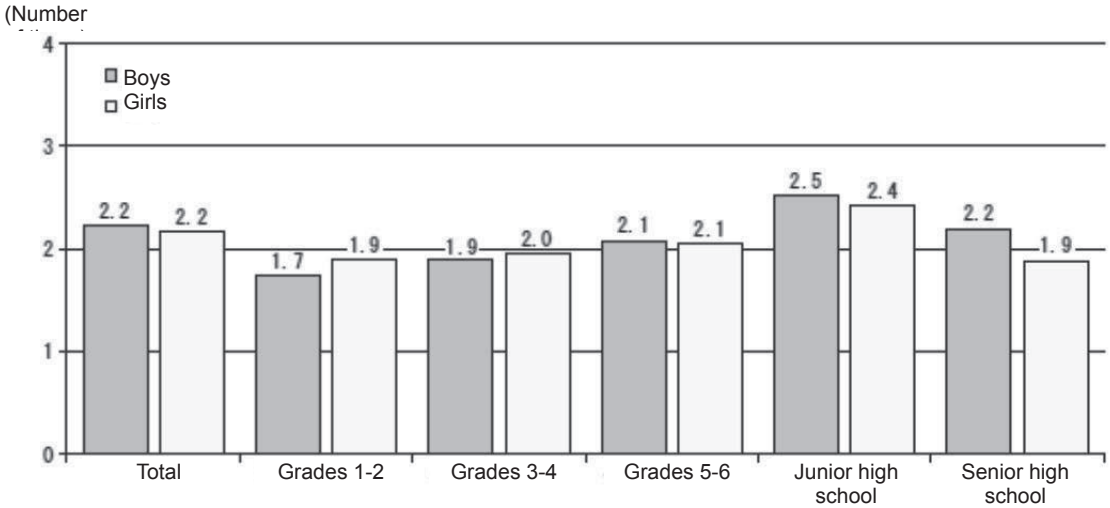


Figure 5-17-2 Average number of times of going to tutoring schools in a week
(Only those who answered "I go to a tutoring school" in the previous question answered this question.)

17.3 The amount of the time spent at tutoring schools in a week

(Only those who answered "I go to a tutoring school" in the previous question answered this question.)

The overall average spent at tutoring schools in week was 4:31 for boys and 4:25 for girls. When compared by school age and gender, it was 2:07 and 2:14 for grades 1-2 boys and girls, 2:42 and 2:46 for grade 3-4 boys and girls, 3:38 and 3:45 for grades 5-6 boys and girls, respectively. It was 6:04 for boys and 5:54 for girls at junior high school and 4:38 for boys and 3:59 for girls at senior high school. Compared to the last survey, the boys and girls at grades 3-4 and the boys and girls at senior high school became shorter.

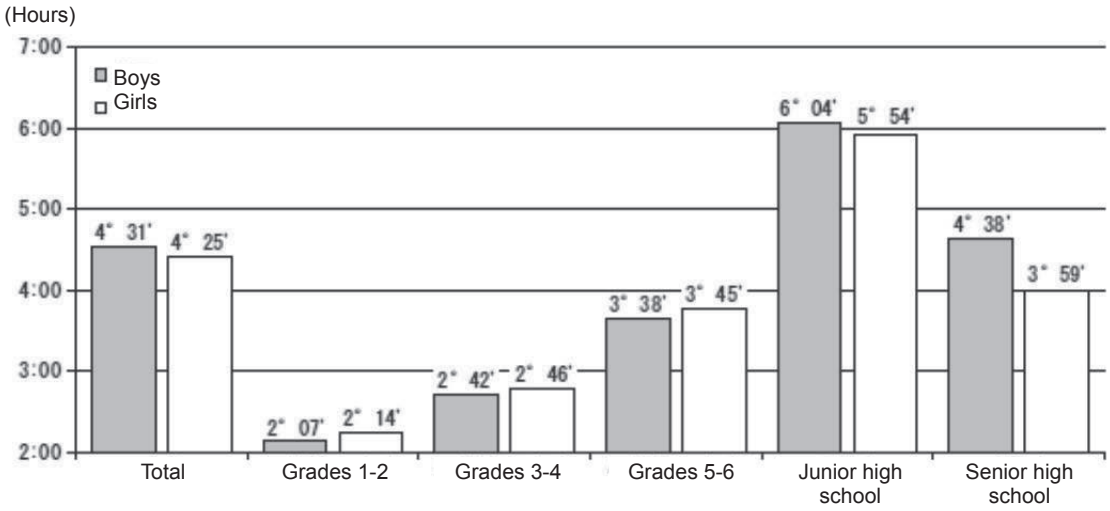


Figure 5-17-3 Average number of hours that children/students spend at tutoring schools in a week
(Only those who answered "I go to a tutoring school" in the previous question answered this question.)

18 Lessons (excluding sports)

18.1 Whether or not children/students take lessons (excluding sports)

Those who take lessons (excluding sports) accounted for 22.2% in boys and 41.4% in girls; the girls were twice as high as the boys.

When compared by school age and gender, 36.7% of boys and 58.1% of girls at grades 1-2 did. It was 35.5% of boys and 60.0% of girls at grades 3-2, 31.7% of boys and 56.5% of girls at grades 5-6, 10.0% of boys and 27.2% of girls at junior high school, and 2.9% of boys and 13.2% of girls at senior high school.

There were only slight changes compared to the last survey.

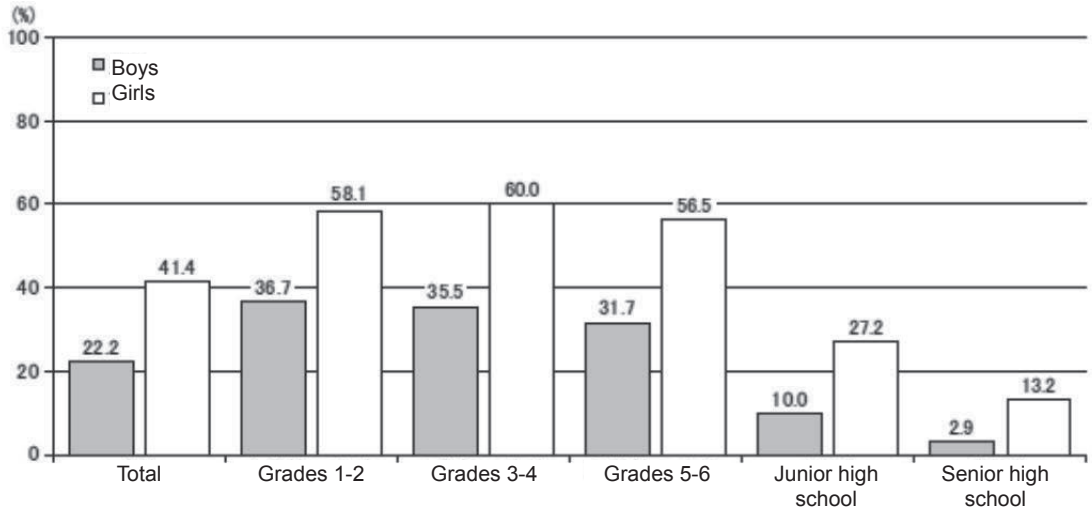


Figure 5-18-1 Proportion of those who take lessons (excluding sports)

18.2 Number of times that children/students take lessons (excluding sports) in a week

(Only those who answered "I take lessons (excluding sports)" answered this question.)

Boys and girls take lessons (excluding sports) 1.8 times and 1.7 times in a week, respectively. When compared by school age and gender, no different between boys and girls nor school ages was observed, ranging from 1.7 to 1.9 times. It was 1.7 times for boys and 1.3 times for girls at junior high school and 1.8 times for boys and 1.4 times for girls at senior high school, suggesting that school age did not make any difference for boys but there was a decrease for girls as school age advanced.

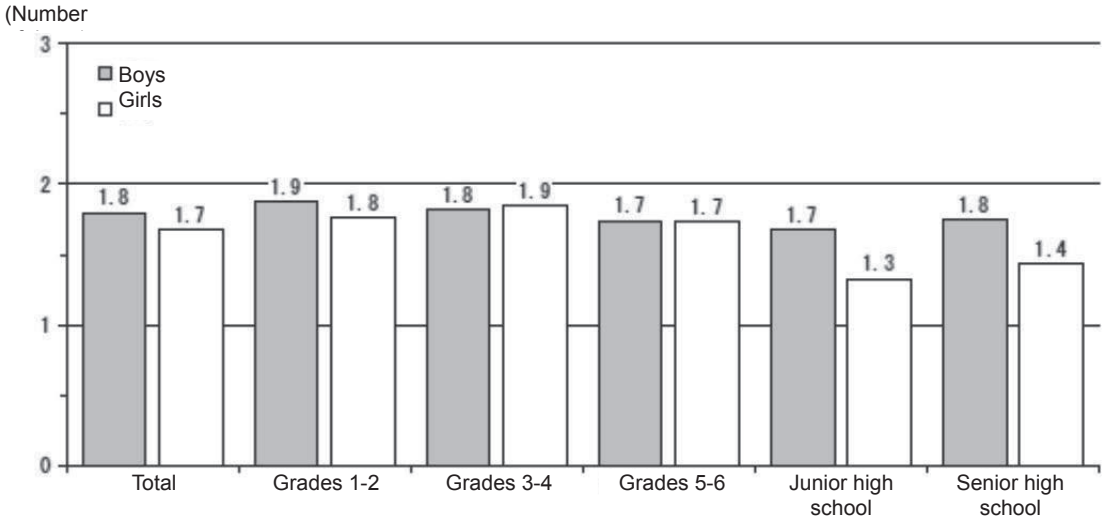


Figure 5-18-2 Average number of times that children/students take lessons (excluding sports) in a week
(Only those who answered "I take lessons (excluding sports)" answered this question.)

18.3 The amount of the of times for lessons (excluding sports) in a week

(Only those who answered "I take lessons (excluding sports)" answered this question.)

The average number of hours spent for lessons in week overall was 2:14 for boys and 2:06 for girls. In terms of school age, for boys it was 2:20 for elementary school grades, 3:34 for junior high school, and 3:25 for senior high school, showing a trend of spending longer as school age advanced. For girls, it was roughly 2 hours for most school ages but became longer in senior high school to 2:37. Among junior and senior high schools, boys were spending longer than girls. Compared to the last survey, it became longer for junior and senior high school boys but shorter for senior high school girls.

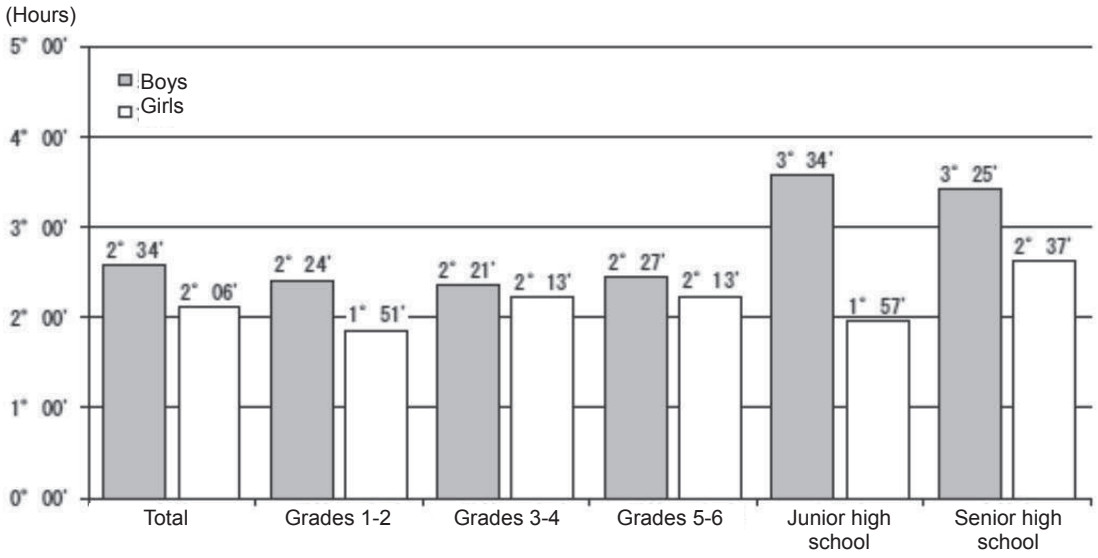


Figure 5-18-3 Average number of hours that children/students spend on lessons (excluding sports) in a week
(Only those who answered "I take lessons (excluding sports)" answered this question.)

19 Results including cross tabulation

1) Those who belong to extracurricular physical activities or sport clubs could easily fall asleep and wake up compared to those who do not, and a fewer number of them felt a lack of sleep ($p< 0.01$). They also had better bowel movement and breakfast status ($p< 0.01$).
2) Those who belong to extracurricular physical activities or sport clubs had lower diastolic blood pressure and higher HDL cholesterol compared to those who do not ($p< 0.05$).
3) Those who belong to extracurricular physical activity or sport clubs spent significantly less time statistically for reading, listening to music, playing games excluding online games, watching a television, and using a mobile phone or smartphone, tablet, or computer statistically compared to those who do not; and they spent significantly less time on the Internet watching videos, playing online games, reading news, exchanging SNS and/or e-mails, and talking on a phone.
4) Those with abnormal LDL cholesterol levels tended to spend short time in high-intensity exercise; however, there was no difference for the medium- and low-intensity exercise times.
5) Many of those who have no problem falling asleep and waking up with good bowel movement tended to have a long exercise time in total.

20 Summary

The survey results on lifestyle this time showed a tendency that the average hours of sleep is becoming longer for junior and senior high school boys and girls, when compared to some recent surveys. However, it did not lead to improve the status in waking up or having a feeling of lack of sleep. In addition, it seemed that the status of falling asleep is worsening. Habits in lifestyle and exercise need to be reevaluated because the time spent using a mobile phone and smartphone and the time spent on exercise are influencing the hours of sleep. A television, DVD, Internet videos have been raised as the overall cause for lack of sleep, and family lifestyle is also affecting elementary school children as well. Sleep is very important for tuning up the life rhythm for school children and students, and school needs to work together with home and provide guidance in order to improve both the quality and quantity of sleep for school children and students.

As for breakfast, more than 95% of boys and girls in elementary school are having breakfast almost every day. Compared to them, however, high percentages of junior high school boys and girls and high school boys tended to skip breakfast, and many in the obese or thin group also tended to skip breakfast compared to the normal group. Considering that many of those who skip breakfast wake up later and/or eat again after dinner, the need for training to have regular life rhythm and eating habits should be emphasized. In terms of what are served in meals, many only eat "the staple food" for breakfast, and those who are eating a nutritionally well-balanced meal with "the staple food, a main dish, and a side dish" accounted for only one quarter of all. The nutritional guidance for having a balanced meal with the staple food, a main dish, and a side dish should continue to be provided.

As for snacking and having an extra meal after dinner, not may continue to eat snacks overall; however, those who often do answered that they often eat again after dinner or leave some food on the dishes, which suggest that children/students need to be educated on how to eat snacks (between meals or after dinner).

In this survey, body shape was revived after 4 years as a survey item. In particular, personalized guidance and support precisely and carefully designed for children/students who belong to the obese or thin group as well as the correct knowledge on ideal body weight and diet should be provided urgently, considering that about 70-80% of junior and senior high school girls have a desire for thinness, that one every two senior high school girls have been on a diet to lose weight following her own plans in many cases.

More than 70% of boys and less than 60% of girls are involved in physical activities, with a decreasing trend as school age advanced. The total movement time is substantially decreased from the last survey to less than 6 hours for boys and about 4 hours for girls, but it increased as school age advanced. According to the distribution of the total exercise time, 4 hours or less was common in both boys and girls across all school ages, with a bipolar trend for junior and senior high school students. The obese group occupied a low percentage in terms being physically active, and the thin group was also low at junior and senior high schools. In terms of exercise time, the low percentage by the thin group was marked in both boys and girls at senior high school.

As for how school children/students spent time outside of school, being involved in reading, music appreciation, games, and television occupied high percentages.

The use of the Internet was mainly done through mobile phones and smartphones; 50 to 60% of junior high school students spent about an hour, and most of senior high school students spent about 2.5 hours. The use of SNS showed a similar trend to that of mobile phones and smartphones. The total screen time was over 5 hours when the times for games, Internet, and television were combined, and it was particularly longer for junior and senior high school students.

Those who study at home accounted for over 90% of elementary school children and junior high school students and about 80% of senior high school students, and roughly 30% of children/students were involved in tutoring schools or lessons.

This survey revealed that the number of hours spent on the Internet through mobile phones or smartphones has rapidly increased, which seems to be corresponding to the drastically reduced exercise time.

Chapter 6 Overview of the Survey Results on Subjective Symptoms Related to Mental Health

1. Introduction

The question items on subjective symptoms related to mental health used to consist of 8 items on total, 3 items on mood change and 5 items on physical symptoms associated with mood, as the "trend of temper dysregulation" until the survey before the last one. The survey committee had independently designed the evaluation criteria using the evaluation methods of the American Psychiatric Association as reference by adjusting them for school children/students of Japan so that these 8 items can be used to evaluate the status of mental health related to mood and emotion. These evaluation criteria had been validated as having sufficient reliability and validity to be applied to children/students in general. In the last survey, while still following the items on the "trend of temper dysregulation" that had been used until the survey before the last one, the committee added 10 new question items with the intention to evaluate the mental health status of multifaceted children/students using the question items of the Strength and Difficulties Questionnaire (SDQ) as reference while considering the commonality with previously used questions -- namely, "depression" (Q34.1, 2, 5, and 7), "hyperactivity" (Q34.3 and 4), emotions (Q34.6 and Q35.1), "behavior" (Q35.1 and 2), "friends" (Q35.4 and 5), "prosociality" (35.6 and 7), "feeling of self-esteem" (Q35.8 and 9), and "suppressed anxiety" (Q35.10 and 11) -- resulting in 18 question items in total.

Additionally, Q34.7 "Sometimes I think I want to die, lately" was asked only to junior and senior high school students, and a student him/herself was instructed to fill in the answer, not the parent.

The items that were changed in the last survey were used as the base in this survey, but the exact statements for two question items were modified. The 2 items in Q35 were the ones that were modified; the expressions of "animals" and "more than being with other children" were removed from Q35.3 and Q35.5, respectively.

Then, the results of each item were cross-tabulated by gender in relation to the body shape of "thin" or "obese" and subjective symptoms on mental health, as it was done in the last survey.

In the last survey, the effect on mental health among children/students due to the Great East Japan Disaster was evaluated by cross-tabulating the results of each item by either the disaster areas or not the disaster areas. The same analysis was performed in this survey as well, and the results were compared to the last survey.

2 Results of each survey item

There are 4 levels of answers available in Q34 and Q35: "Often (about once a week),", "Occasionally (about once a month)," "Rarely (less than once a month)," and "No" for Q34, and "Very applicable," "Applicable," "Rarely applicable," and "Not applicable" for Q35. In this report, "Often" and "Occasionally" in Q34 and "Very applicable" and "Applicable" in Q35 were grouped together as the positive answer group in each group.

2.1 "Depression" item in Q34.1, 2, 5, and 7

In Q34.1, "Sometimes I feel like I don't want to do anything because I feel depressed," those who answered positively by answering "often" or "occasionally" accounted for 23.1% in boys and 28.2% in girls. When compared by school age and gender, it was 7.2% and 8.3% in grades 1-2 boys and girls, 11.3% and 10.6% in grades 3-4 boys and girls, 12.2% and 13.8% in grades 5-6 boys and girls, 34.8% and 48.0% in junior high school boys and girls, and 44.4% and 49.8% in senior high school boys and girls, respectively, showing an increasing trend in positive answers from elementary school grades and up with advancing age. Junior and senior high school students, who answered the question themselves, particularly tended to answer positively, which was also seen in the last survey. In terms of gender, the boys at grades 3-4 answered positively more often than the girls at 0.7%, but girls answered positively more often than boys in other school ages. The positive answer reached nearly 50% in girls at junior and senior high schools. Compared with the last survey, the positive ratio in boys was 0.3% higher overall; it was 1.5% lower for grades 1-2, 0.6% lower for grades 3-4, 0.5% higher for grades 5-6, 2.2% lower for junior high school, and 3.1% lower for senior high school boys. For girls, it was 1.0% higher overall, 3.7% higher for grades 1-2, 1.0% higher for grades 3-4, 0.6% higher for grades 5-6, 0.5% lower for junior high school, and 10.1% lower for senior high school girls. The senior high school girls particularly dropped from 59.9% to 49.8%, and those who answered "I do not feel so" increased from 13.2% to 18.4%, showing a 5.2% increase.

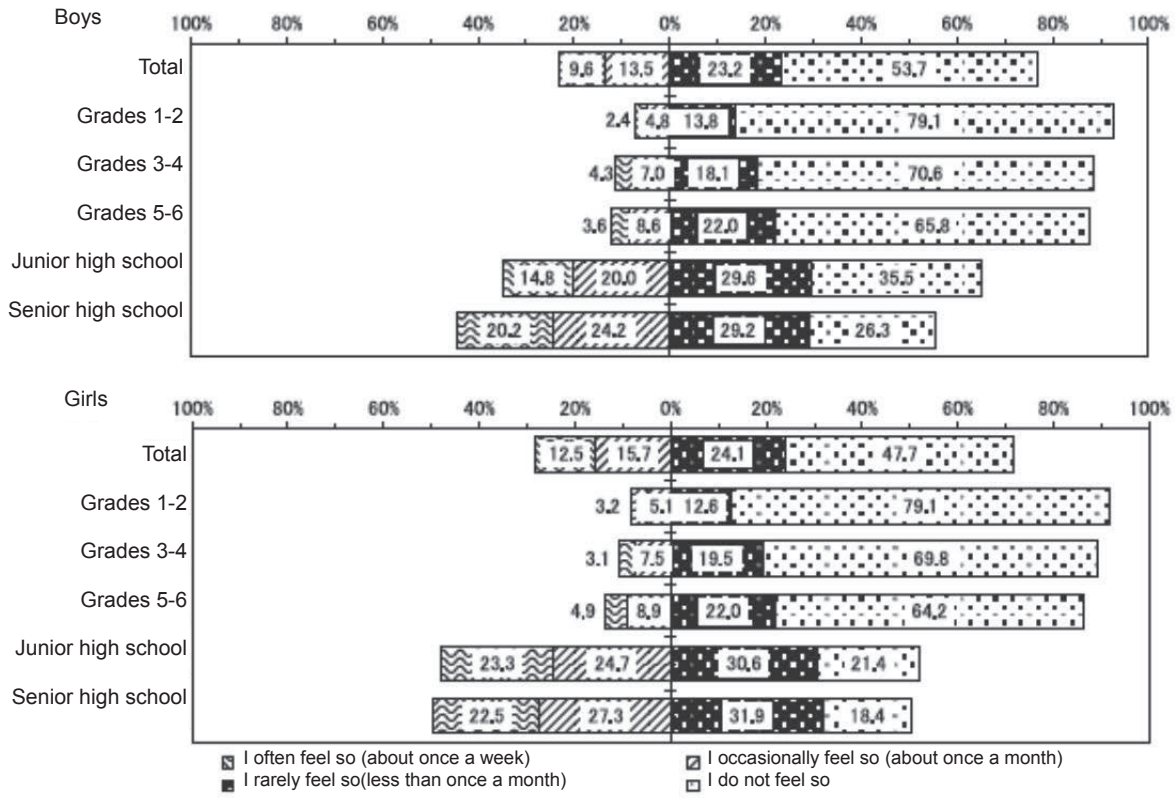


Figure 6-2-1 Sometimes I feel like I don't want to do anything because I feel depressed

Q34.2 "Sometimes I have trouble sleeping" shows a similar tendency as Q34.1. The positive group, "often" and "occasionally" combined, accounted for 18.6% in boys and 21.3% in girls.

When compared by school age and gender, the positive ratio was 4.1% and 4.7% in grades 1-2 boys and girls, 6.5% and 8.8% in grades 3-4 boys and girls, 10.8% and 13.2% in grades 5-6 boys and girls, 32.4% and 37.0% in junior high school boys and girls, and 32.3% and 34.2% in senior high school boys and girls, respectively, showing an increasing trend in positive answers from elementary school grades and up with advancing age. In junior high school and up, the positive ratio reaches over 30% overall. Compared with the last survey, the positive ratio in boys was 2.5% higher overall; it was 14.1% lower for grades 1-2, 0.8% higher for grades 3-4, 1.6% higher for grades 5-6, 3.2% higher for junior high school, and 1.4% higher for senior high school boys. For girls, it was 12.1% higher overall, 0.3% higher for grades 1-2, 0.6% higher for grades 3-4, 1.8% lower for grades 5-6, 2.4% higher for junior high school, and 4.7% higher for senior high school girls. Compared with the last survey, the positive ratio in boys was 2.5% higher overall; it was 0.2% lower for grades 1-2 but 0.8%, 1.6%, 3.2%, 1.4% higher for grades 3-4, grades 5-6, junior high school, and senior high school boys, respectively. It was 2.1% higher for girls overall; it was 0.3% and 0.6% higher for grades 1-2 and grades 3-4, respectively, but 1.8% lower for grades 5-6, and 2.4% and 4.7% higher for junior high school and senior high school girls, respectively.

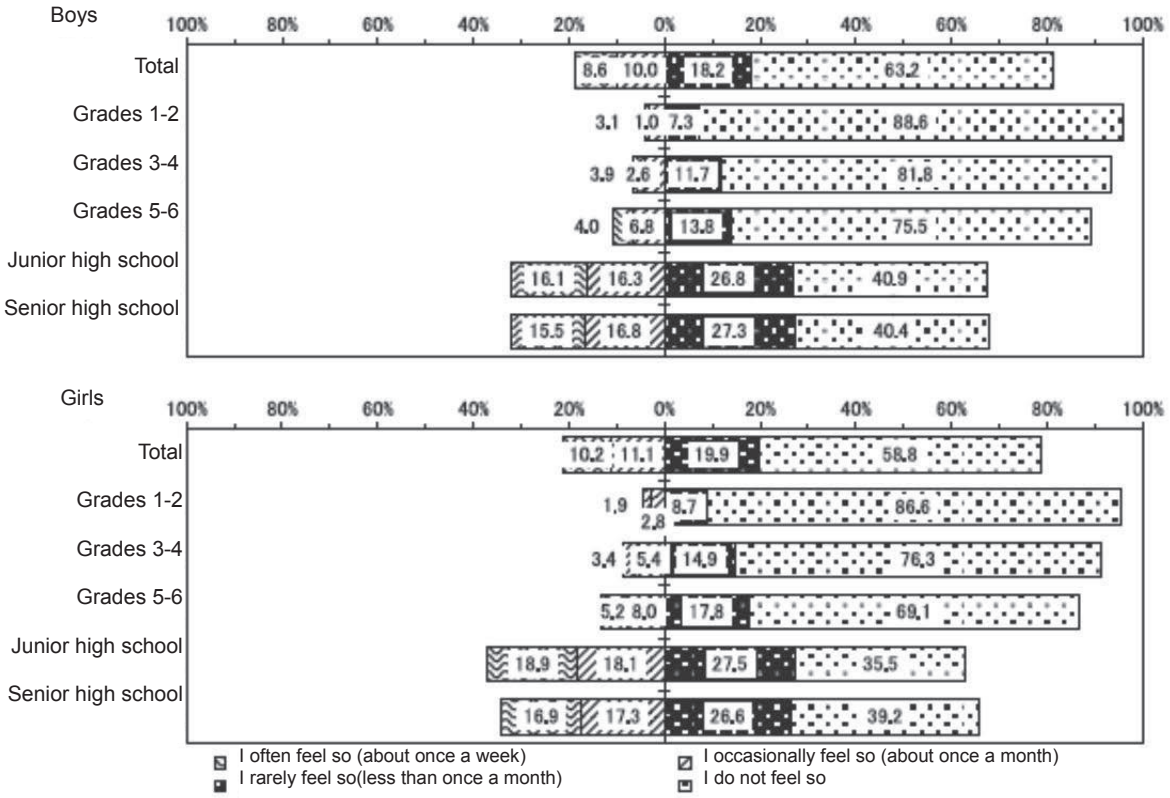


Fig. 6-2-2 Sometimes I have trouble sleeping

Q34.5, “Sometimes I do not have an appetite” showed that the positive group of “often” and “occasionally” accounted for 13.8% in boys and 15.0% in girls.

When compared by school age and gender, the positive ratio was 8.0% of boys and 7.6% of girls at grades 1-2, 7.1% of boys and 7.7% of girls at grades 3-4, 9.4% of boys and 6.8% of girls at grades 5-6, 20.4% of boys and 26.8% of girls at junior high school, and 20.8% of boys and 20.5% of girls at senior high school, meaning that the positive ratios in the girls at grades 3-4 and junior high school were higher than those of the boys. The answer “often” was 9.5% and “occasionally” was 17.3%; when combined, roughly 1 out of 4 girls answered positively at 26.8%.

The answer “I do not feel so” occupied over 60% overall among elementary school grades. In terms of gender, the boys were 2.6% higher than the girls at grades 5-6 and the girls were 6.4% higher than the boys at junior high school, but the gender differences among other age groups were small at 0.6% or less.

Compared with the last survey, the positive ratio in boys was 0.3% lower overall; it was 1.2% higher for grades 1-2, 0.2% lower for grades 3-4, 0.4% lower for grades 5-6, 1.2% higher for junior high school, and 0.7% lower for senior high school boys. It was 0.8% higher overall for girls; it was 0.4% and 1.2% higher for grades 1-2 and grades 3-4 but 0.3% lower for grades 5-6, the same for junior high school, and 1.7% higher for senior high school girls.

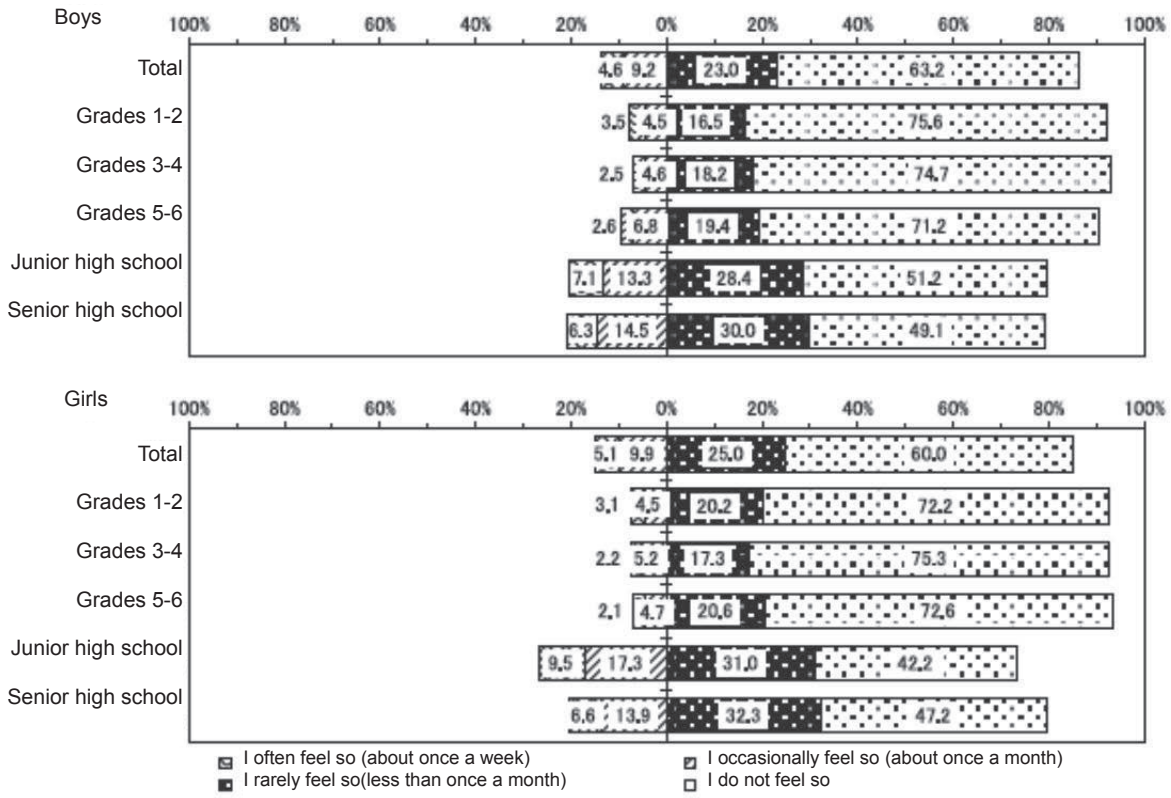


Fig. 6-2-3 Sometimes I do not have an appetite

Q34.7 “Sometimes I think I want to die” was a survey item only for junior and senior high schools because students were asked to answer themselves.

The answer “I do not feel so” occupied 85.7% of boys and 77.2% of girls overall while 14.3% of boys and 22.8% of girls answered “Sometimes I feel I want to die,” suggesting that the proportion is again higher in girls as same as the last survey.

Overall, the positive answer group that combined the “often (about once a week)” and “occasionally (about once a month)” occupied 5.6% in boys and 8.7% in girls. When compared by school age and gender, it was 5.0% and 9.0% in junior high school boys and girls and 6.7% and 8.3% in senior high school boys and girls, respectively, suggesting that roughly 1 out of 12 girls feel like “I want to die (about one a month or more frequently.)”

Compared to the last survey, the positive ratio in boys was 0.7% lower overall; it was 0.9% and 0.5% lower for junior and senior high school boys, respectively. For girls, the positive ratio was 1.4% lower overall; it was 1.3% and 1.3% lower for junior and senior high school girls, respectively.

Some cooperating schools in the surveillance asked to exclude this particular item from the survey, and this question was excluded at Junior high school.

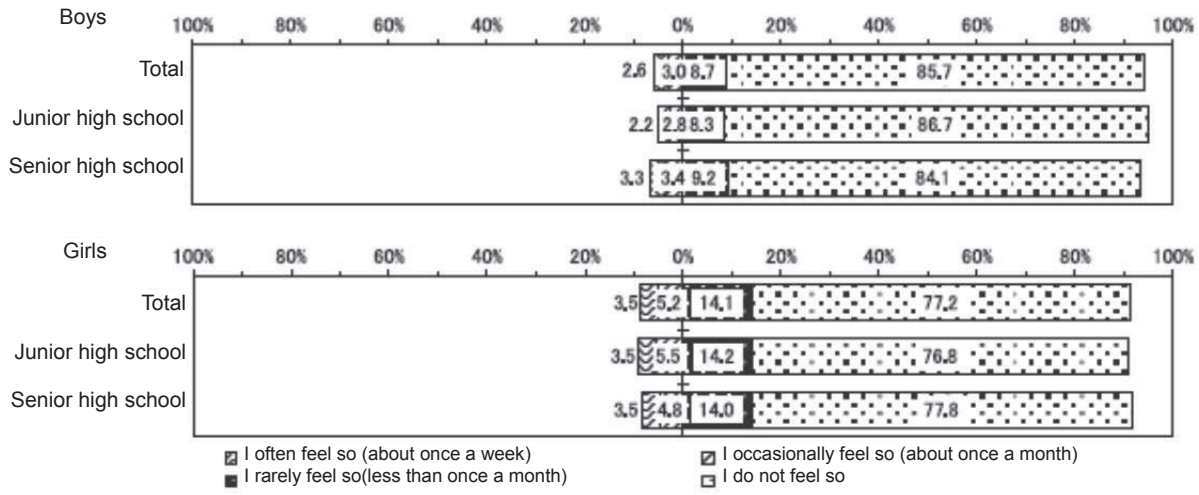


Figure 6-2-4 Sometimes I think I want to die

For the items on depression, the positive answer tends to become higher in older age groups; the positive answer group increased overall and girls were higher than boys among junior and senior high school students who fill out the answer themselves compared to elementary school children whose parent fill out the answer.

2.2 "Hyperactivity" item in Q34.3 and 4

In Q34.3 "I cannot stay still because I cannot be calm," the positive answer group that combined "often" and "occasionally" occupied 23.9% in boys and 18.4% in girls, suggesting that the proportion is higher in boys than in girls; in particular, "often" occupied a high percentage at 15.1% in grades 1-2 boys.

When compared by school age and gender, the positive ratio was 23.0% in boys and 13.4% in girls at grades 1-2, 21.0% in boys and 11.5% in girls at grades 3-4, 16.7% in boys and 10.6% in girls at grades 5-6, 28.9% in boys and 26.5% in girls at junior high school, and 27.1% in boys and 25.3% in girls at senior high school. The positive ratio was higher in boys than in girls across all periods; it tended to decrease in elementary school boys in higher age groups, and it was slightly high for grade 1-2 girls but there was little change from grades 3-4 to grades 5-6.

The positive ratio reached 25% or higher in both boys and girls among junior and senior high school students who fill out the answer themselves. The ratios in girls were slightly lower compared to those of boys.

Compared with the last survey, the positive ratio in boys was 2.0% lower overall; it was 1.1% lower for grades 1-2, 0.3% higher for grades 3-4, 3.0% lower for grades 5-6, 3.1% lower for junior high school, and 6.1% lower for senior high school boys. For girls, it was 0.1% higher overall, 1.7% higher for grades 1-2, 1.1% lower for grades 3-4, 0.1% lower for grades 5-6, 0.1% lower for junior high school, and 4.1% lower for senior high school girls.

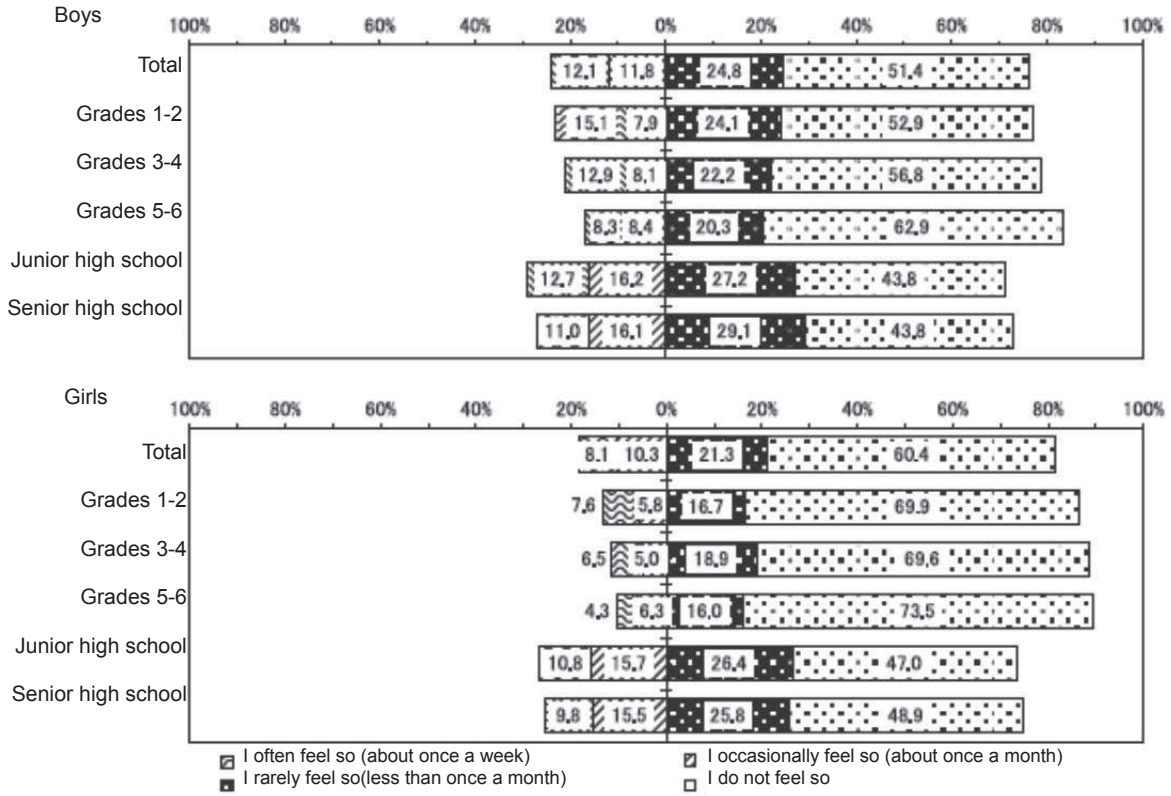


Figure 6-2-5 I cannot stay still because I cannot be calm

In Q34.4, “Sometimes I have trouble focusing or thinking fast,” the positive answer group that combined “often” and “occasionally” occupied 32.8% of boys and 29.5% of girls, overall.

When compared by school age and gender, the positive ratio was 28.7% in boys and 20.2% in girls at grades 1-2, 29.0% in boys and 19.5% in girls at grades 3-4, 23.3% in boys and 17.7% in girls at grades 5-6, 40.5% in boys and 42.0% in girls at junior high school, and 39.2% in boys and 41.6% in girls at senior high school.

The boys’ positive ratio was higher than that of girls by 5.6-9.5% across elementary school periods, but a decrease was observed in grades 5-6 boys mainly in the answer “often.” The answer “often” also decreased in grades 5-6 girls to as low as 6.4%.

However, the proportion of positive answers became higher in both boys and girls in junior high school ages and up, and slightly more girls answered positively than boys, reaching over 40%. On the contrary, those who answered “I do not feel so” was slightly higher in boys: 26.2% and 25.7% in junior and senior high school boys, and 21.8% and 22.4% in junior and senior high school girls, respectively.

Compared with the last survey, the positive ratio in boys was 0.6% lower overall; it was 2.1% higher for grades 1-2, 3.4% higher for grades 3-4, 0.8% higher for grades 5-6, 1.5% higher for junior high school, and 8.6% lower for senior high school boys. For girls, it was 0.6% lower overall, 1.0% higher for grades 1-2, 1.0% lower for grades 3-4, 2.1% lower for grades 5-6, 0.8% lower for junior high school, and 6.1% lower for senior high school girls.

The drop in the positive ratios in both boys and girls at senior high school were larger compared with the drop observed in the last survey. As a result, the positive ratio of senior high school students that was higher than that of the junior high school students in the last survey was similar or slightly lower than that of the junior high school students this time.

It appeared that “hyperactivity and fail to focus “ are slightly reduced in both boys and girls from the lower grades in elementary school to senior high school, but the figures were high for junior and senior high school students who filled out the answer themselves. The rise in junior high school girls in Q34.4 was particularly high, and the positive ratio was higher in girls than in boys.

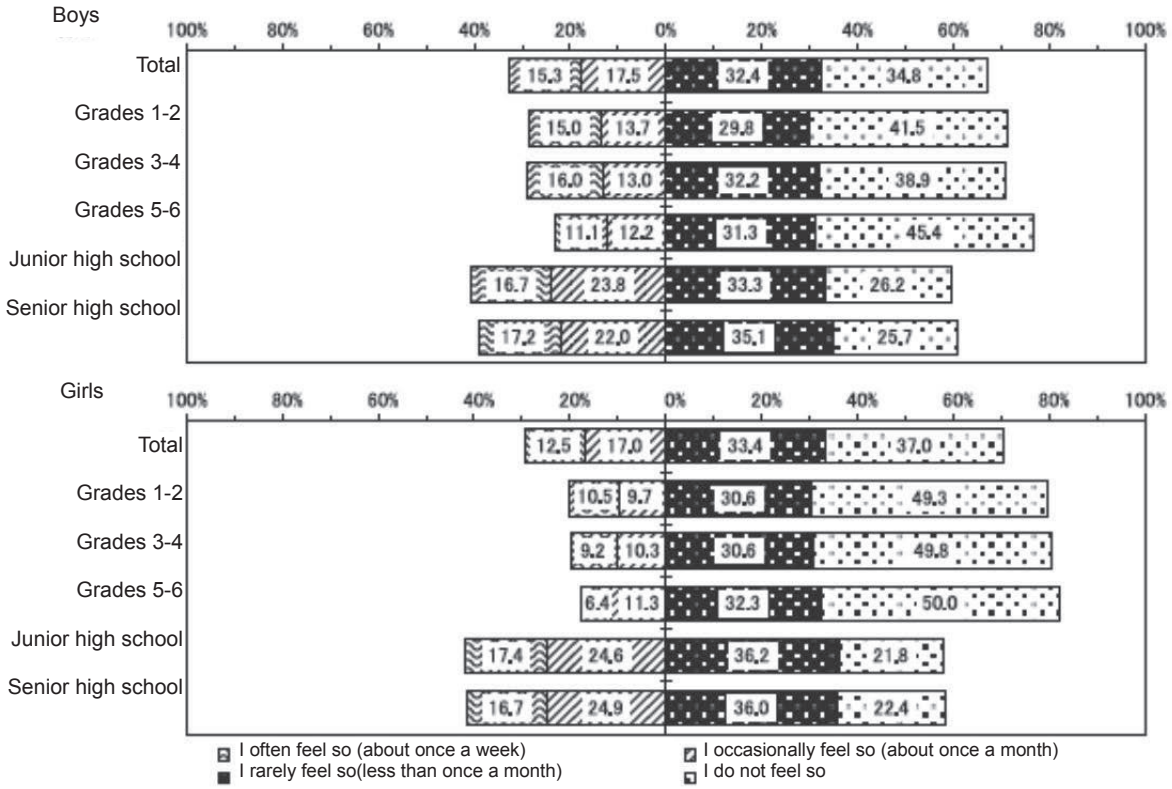


Figure 6-2-6 Sometimes I have trouble focusing or thinking fast

2.3 "Emotions" item in Q34.6 and Q35.1

Q34.6Sometimes I feel dull or easily tired

The positive group that "often" and "occasionally" were combined accounted for 31.7% in boys and 34.2% in girls.

When compared by school age and gender, the positive ratio was 7.4% in boys and 6.9% in girls at grades 1-2, 11.7% in boys and 10.4% in girls at grades 3-4, 18.6% in boys and 18.9% in girls at grades 5-6, 52.4% in boys and 60.3% in girls at junior high school, and 58.2% in boys and 60.1% in girls at senior high school.

The proportions of positive answers were roughly the same between boys and girls in elementary school, but girls were higher than boys in junior and senior high schools. In particular, more than half of both boys and girls in junior and senior high schools answered positively, reaching to about 60% in junior and senior high school girls. More than half of both boys and girls in junior and senior high schools also answered that they sometimes feel "dull" or "easily tired."

Compared with the last survey, the positive ratio in boys was 0.6% higher overall; it was 2.1% lower for grades 1-2, 0.2% lower for grades 3-4, 0.3% higher for grades 5-6, 0.5% lower for junior high school, and 5.9% lower for senior high school boys. For girls, it was 0.9% lower overall, 1.9% lower for grades 1-2, 2.5% lower for grades 3-4, 2.5% lower for grades 5-6, 1.0% lower for junior high school, and 8.3% lower for senior high school girls. The drop in the positive ratios in both boys and girls at senior high school were larger compared with the drop observed in the last survey.

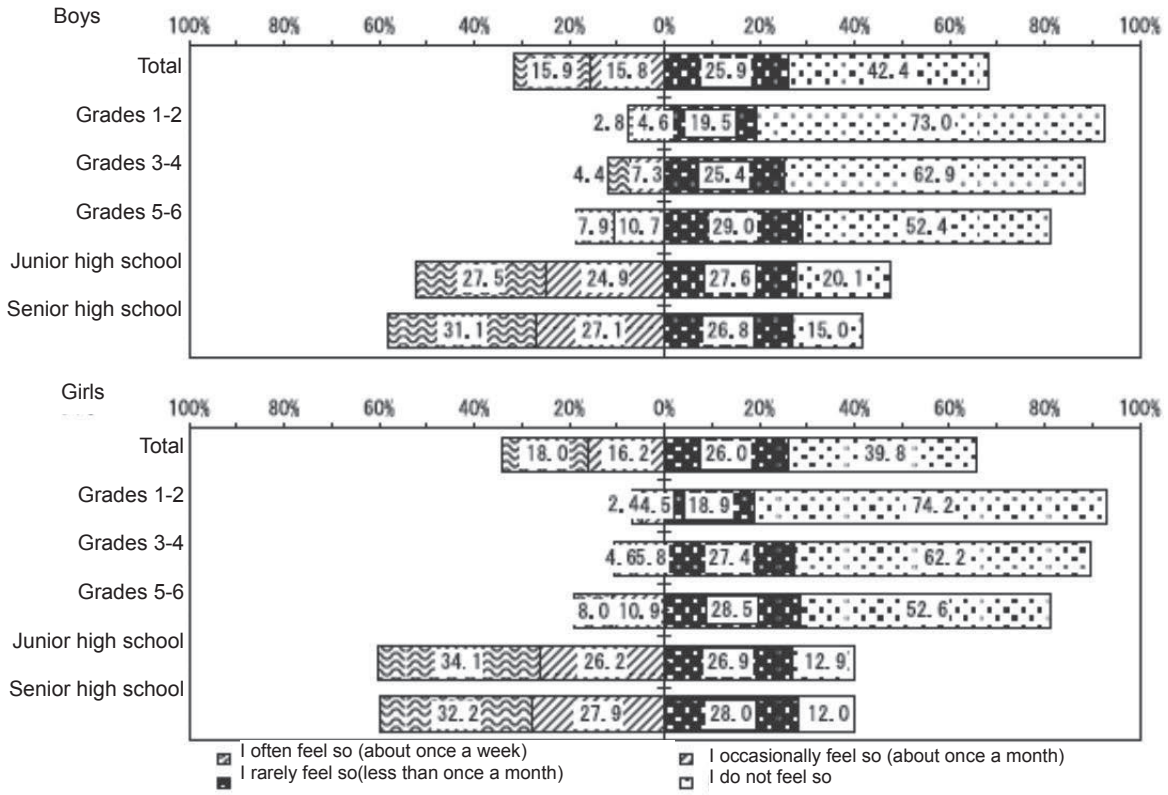


Figure 6-2-7 Sometimes I feel dull or easily tired

Q35.1 “Sometimes I suddenly feel angry, starts crying, or feel happy”

The positive group that combined “very applicable” and “applicable” accounted for 21.0% in boys and 29.1% in girls, overall.

When compared by school age and gender, the positive ratio was 20.2% in boys and 20.1% in girls at grades 1-2, 18.2% in boys and 18.2% in girls at grades 3-4, 15.9% in boys and 17.5% in girls at grades 5-6, 25.6% in boys and 42.3% in girls at junior high school, and 23.3% in boys and 40.5% in girls at senior high school.

At elementary school, the positive ratio decreases as age groups become older in both boys and girls, but the percentages for boys are higher than girls and girls showed less change than boys.

For junior and senior high schools, the positive ratio was roughly 25% in boys but was as high as 40% or higher in girls.

The proportion of positive answers was low compared to Q34.6 that asks about physical symptoms; however, the positive ratio rose in junior and senior high schools, and a gender difference among junior and senior high school students was notable in this particular item that asks about mood change.

Compared with the last survey, the positive ratio in boys was 0.9% lower overall; it was 1.0% lower for grades 1-2, 2.1% lower for grades 3-4, 0.8% lower for grades 5-6, 0.9% higher for junior high school, and 3.9% lower for senior high school boys. For girls, it was 0.3% lower overall, 1.2% lower for grades 1-2, 0.1% lower for grades 3-4, 0.4% lower for grades 5-6, 1.3% lower for junior high school, and 4.9% lower for senior high school girls.

Compared to the last survey, the difference was smaller than that in Q34.6, but a notable drop in the positive ratio in this question was also confirmed in both boys and girls in senior high school, with junior high school students’ positive ratio being lower than that of senior high school students.

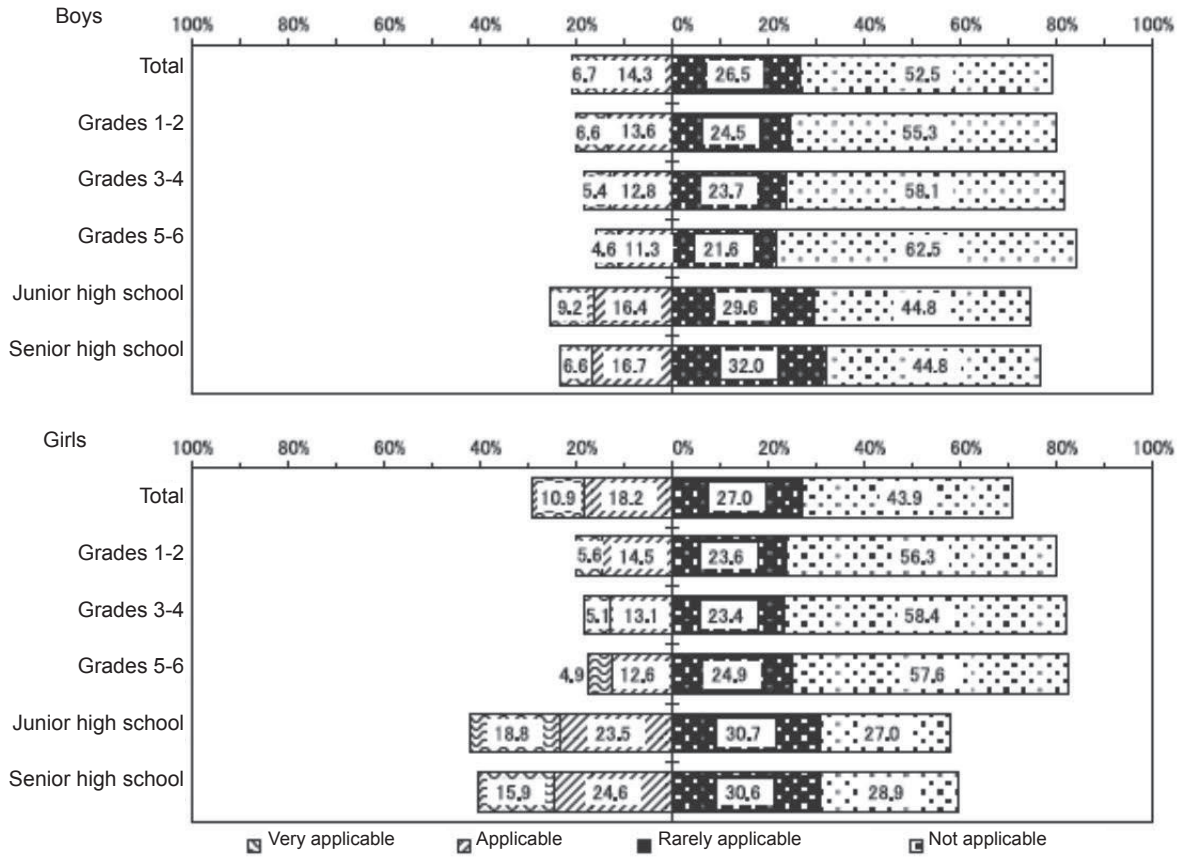


Figure 6-2-8 Sometimes I suddenly feel angry, starts crying, or feel happy

2.4 "Behavior" item in Q35.2 and Q35.3

Q35.2 "Sometimes I lose my temper over trivial things"

The positive group that combined "very applicable" and "applicable" accounted for 26.5% in boys and 25.8% in girls, overall.

When compared by school age and gender, the positive ratio was 32.9% in boys and 24.9% in girls at grades 1-2, 30.7% in boys and 23.0% in girls at grades 3-4, 27.5% in boys and 21.1% in girls at grades 5-6, 22.3% in boys and 29.7% in girls at junior high school, and 21.2% in boys and 28.1% in girls at senior high school.

The positive ratio was higher in boys during the elementary school period, with a decreasing tendency as the school age group advanced. However, the positive ratio was higher in girls than in boys in junior and senior high schools.

Compared with the last survey, the positive ratio in boys was 1.6% lower overall; it was 1.4% higher for grades 1-2, 0.4% lower for grades 3-4, 0.1% lower for grades 5-6, 4.1% lower for junior high school, and 1.5% lower for senior high school boys. For girls, it was 1.4% lower overall, 2.6% higher for grades 1-2, 2.0% lower for grades 3-4, 1.4% lower for grades 5-6, 2.9% lower for junior high school, and 4.9% lower for senior high school girls. The positive ratio was higher this time than the last survey only in the grade 1-2 group in both boys and girls. Compared with the last survey, a major drop of 4 % or more was observed in junior high school boys and senior high school girls.

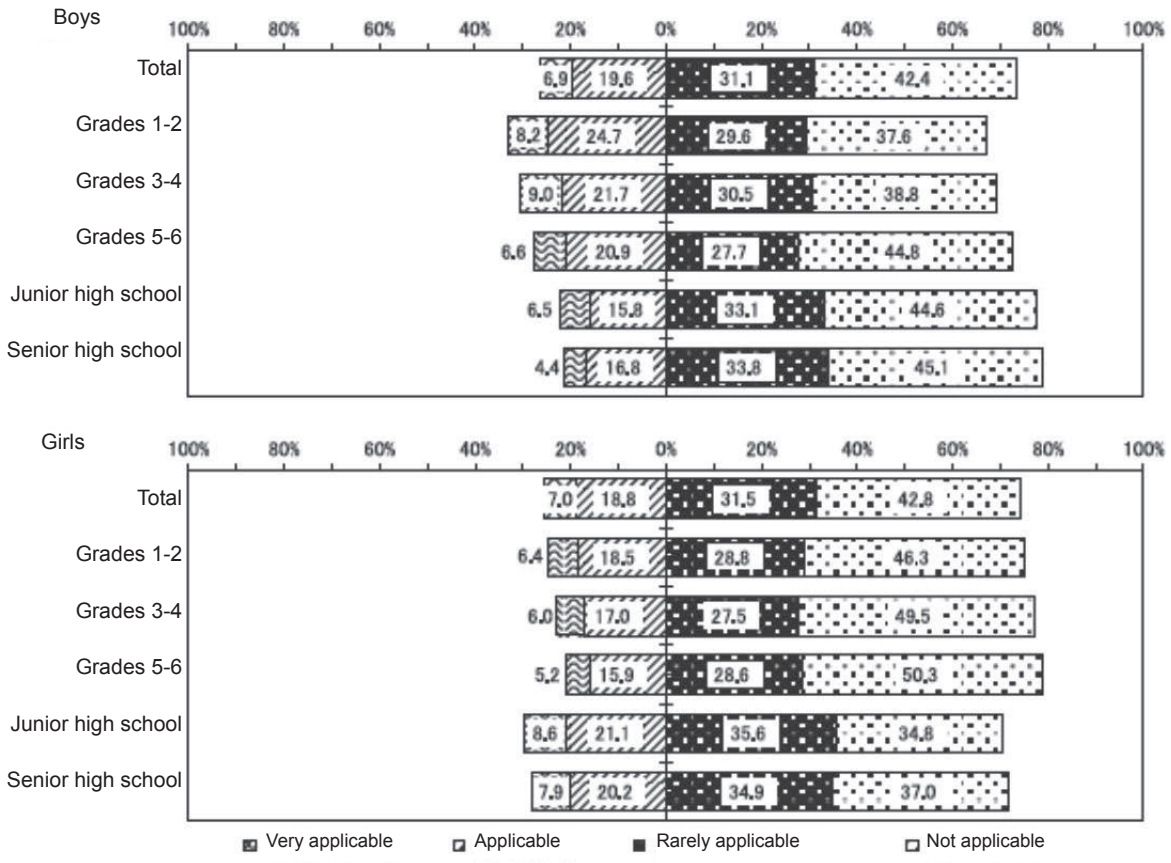


Figure 6-2-9 Sometimes I lose my temper over trivial things

Q35.3 “I have gotten into a quarrel or fight or bullied other children”

The positive group that combined “very applicable” and “applicable” accounted for 7.5% in boys and 3.7% in girls, overall.

When compared by school age and gender, the positive ratio was 10.7% in boys and 5.6% in girls at grades 1-2, 11.1% in boys and 4.8% in girls at grades 3-4, 8.2% in boys and 3.6% in girls at grades 5-6, 6.0% in boys and 3.4% in girls at junior high school, and 2.4% in boys and 1.3% in girls at senior high school. Among elementary school boys, grades 1-2 and 3-4 were both about 11%, although it dropped for grades 5-6 and up. Among girls, it was 5.6% for grades 1-2 and decreased as the age group advanced.

The question statement has been modified in this survey, and the word “animals” was omitted from the “(I have bullied) animals.” The question is now designed to focus on human-to-human “quarrel or fight” and “bullying” by limiting the target to “other children.” As for the result this time, the positive ratio in boys was 2.5% higher overall compared with the last survey; it was 5.0% higher for grades 1-2 4.2% higher for grades 3-4, 3.5% higher for grades 5-6, 1.3% higher for junior high school, and 0.3% higher for senior high school boys. For girls, it was 0.9% higher overall, 3.1% higher for grades 1-2, 1.7% higher for grades 3-4, 0.5% higher for grades 5-6, 0.3% higher for junior high school, and 0.7% lower for senior high school girls. Except for the high school girl group, the positive ratios were higher for all other age groups than those from the last survey.

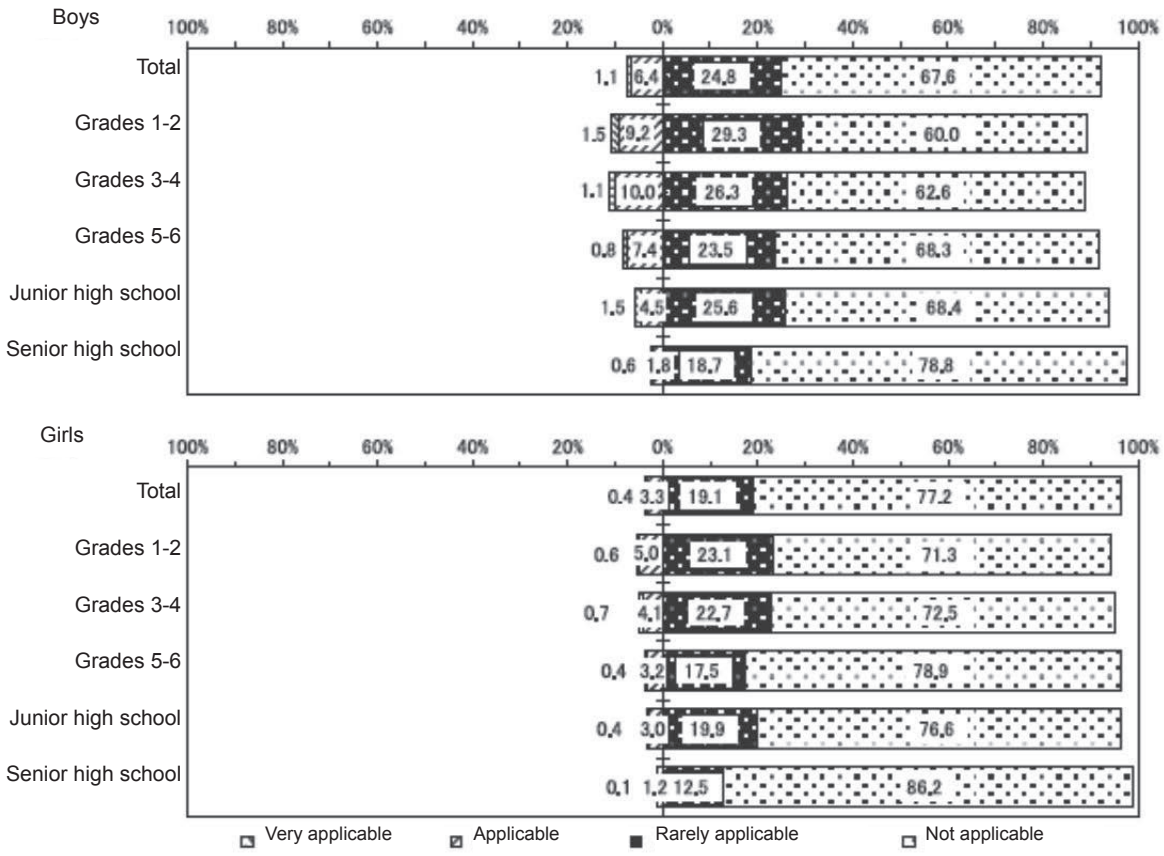


Figure 6-2-10 I have gotten into a quarrel or fight or bullied other children

2.5 "Friends" item in Q35.4 and Q35.5

Q35.4 I have been bullied or teased by others

The positive group that combined "very applicable" and "applicable" accounted for 14.0% in boys and 9.1% in girls, overall.

When compared by school age and gender, the positive ratio was 19.4% in boys and 13.2% in girls at grades 1-2, 19.4% in boys and 11.9% in girls at grades 3-4, 15.4% in boys and 9.7% in girls at grades 5-6, 10.7% in boys and 8.3% in girls at junior high school, and 6.3% in boys and 3.3% in girls at senior high school.

The positive ratio in boys was higher than that in girls across all periods; the peak was grades 3-4 for boys and grades 1-2 for girls, and the percentage dropped with advancing age groups. In this question that asked about an experience of being a victim, the positive ratio was higher in both boys and girls across all age groups compared with the positive ratio in the previous question -- Q35.3 "I have gotten into a quarrel or fight or bullied other children" that asked about an experience of being a perpetrator.

Compared with the last survey, the positive ratio in boys remained the same overall; it was 3.4% higher for grades 1-2, 1.9% higher for grades 3-4, 2.6% higher for grades 5-6, 2.0% lower for junior high school, and 4.0% lower for senior high school boys. For girls, it was 0.1% lower overall, 1.8% higher for grades 1-2, same for grades 3-4, 1.0% higher for grades 5-6, 0.1% higher for junior high school, and 1.8% lower for senior high school girls.

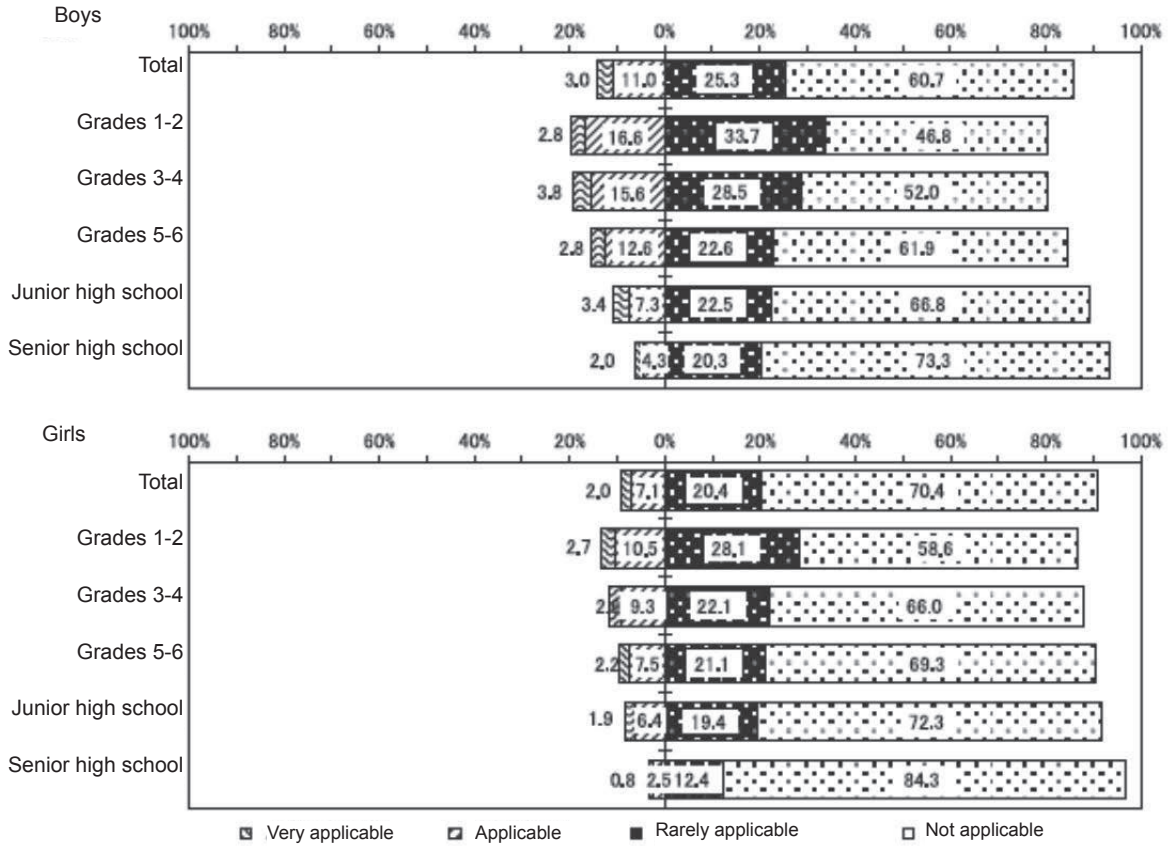


Figure 6-2-11 I have been bullied or teased by other children

Q35.5 “I prefer to be alone and often spend time playing alone”

The positive group that combined “very applicable” and “applicable” accounted for 19.9% in boys and 18.6% in girls, overall.

When compared by school age and gender, the positive ratio was 12.0% in boys and 10.5% in girls at grades 1-2, 14.5% in boys and 11.7% in girls at grades 3-4, 13.2% in boys and 16.2% in girls at grades 5-6, 24.2% in boys and 23.4% in girls at junior high school, and 33.9% in boys and 28.2% in girls at senior high school.

The positive ratio was slightly higher in grades 3-4 than in grades 5-6, but generally tended to increase in both boys and girls as the age group became older. About 1 out of 4 junior high school boys and 1 out of 3 senior high school boys answered that “I prefer to be alone and often spend time alone,” suggesting that the tendency of being alone becomes stronger as the age group becomes older.

The question statement was also modified from the last survey in this question, and an expression of “more than being with other children” was removed that was at the beginning of the question. Compared with the last survey, the positive ratio in boys was 5.1% higher overall; it was the same for grades 1-2, 5.2% higher for grades 3-4, 3.0% higher for grades 5-6, 4.8% higher for junior high school, and 8.8% higher for senior high school boys. For girls, it was 4.2% higher overall, 0.7% higher for grades 1-2, 1.3% higher for grades 3-4, 3.6% higher for grades 5-6, 4.6% higher for junior high school, and 8.1% higher for senior high school girls.

The differences in the positive ratios between this survey and the last among age groups were high, ranging from 4.8-8.8% at junior and senior high school students who answered the question themselves -- the one for senior high school students being the largest -- possibly because the question more clearly indicated the tendency of being alone.

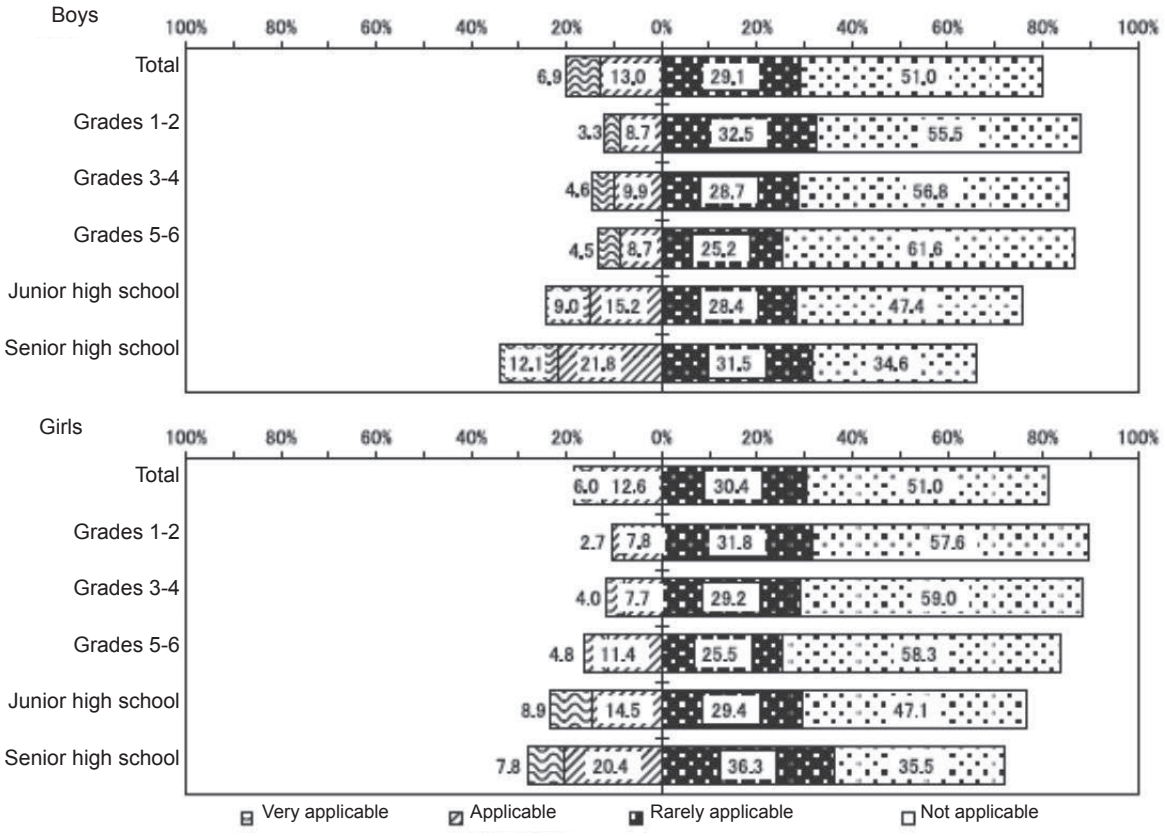


Figure 6-2-12 I prefer to be alone and often spend time playing alone

2.6 “Prosociality” item in Q35.6 and Q35.7

The negative group was also included in the evaluation because negative answers also pose a problem as a subjective symptom in this item.

Q35.6 “I often pay attention to other people’s feelings”

The positive group that combined “very applicable” and “applicable” accounted for 58.2% in boys and 67.8% in girls, overall.

When compared by school age and gender, the positive ratio was 47.6% in boys and 55.4% in girls at grades 1-2, 51.2% in boys and 62.4% in girls at grades 3-4, 54.3% in boys and 65.6% in girls at grades 5-6, 64.6% in boys and 75.1% in girls at junior high school, and 70.5% in boys and 76.4% in girls at senior high school.

Girls were higher than boys, and the ratio increased as the age group became older; roughly half in lower grades in elementary school and over 70% in high school answered that “I often pay attention to other people’s feelings. The result suggested that those in older age groups become more aware of “other people’s feelings.”

In addition, one very 4 to 5 junior and senior high school students answered ““Very applicable,” at 19.8% and 19.4% in junior and senior high school boys and 26.9% and 25.8% in junior and senior high school girls, respectively.

On the contrary, the negative group accounted for 41.9% in boys and 32.2% in girls. When compared by school age and gender, the negative ratio was 52.3% in boys and 44.5% in girls at grades 1-2, 48.8% in boys and 37.6% in girls at grades 3-4, 45.7% in boys and 34.5% in girls at grades 5-6, 35.5% in boys and 24.8% in girls at junior high school, and 29.4% in boys and 23.6% in girls at senior high school. Boys were higher than girls, and the ratio tended to decrease as the age group became older.

Compared with the last survey, the negative ratio in boys was 2.0% lower overall; it was the same for grades 1-2, 3.6% lower for grades 3-4, 0.6% lower for grades 5-6, 1.8% higher for junior high school, and 0.9% higher for senior high school boys. For girls, it was 2.6% lower overall, 1.9% lower for grades 1-2, 0.7% lower for grades 3-4, 2.7% lower for grades 5-6, 3.0% lower for junior high school, and 1.0% lower for senior high school girls.

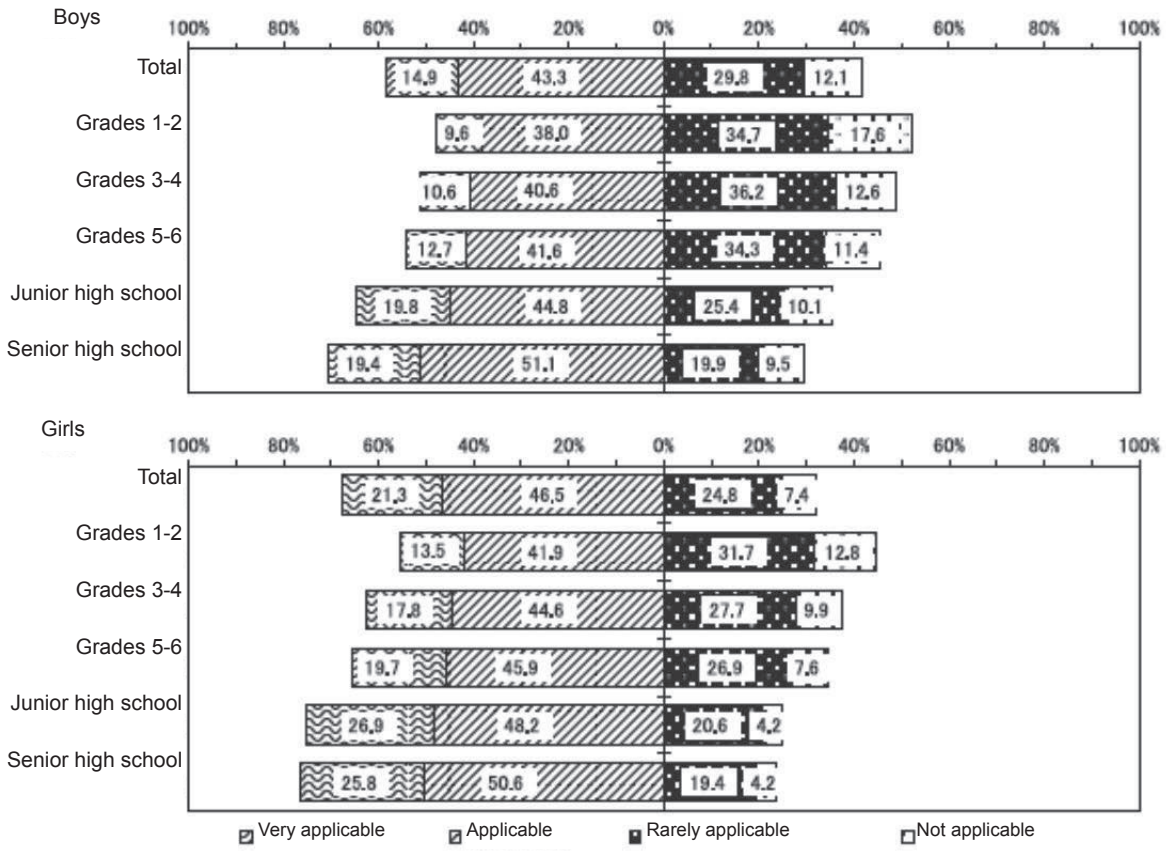


Figure 6-2-13 I often pay attention to other people's feelings

Q35.7 "I tend to willingly help my friend who is feeling depressed due to a problem or feeling obnoxious"

The positive group that combined "very applicable" and "applicable" accounted for 59.0% in boys and 73.9% in girls, overall.

When compared by school age and gender, the positive ratio was 55.0% in boys and 68.1% in girls at grades 1-2, 59.3% in boys and 73.1% in girls at grades 3-4, 59.5% in boys and 73.0% in girls at grades 5-6, 60.1% in boys and 76.4% in girls at junior high school, and 60.5% in boys and 77.5% in girls at senior high school. The positive ratios in girls were about 13-17% higher in girls than in boys across all age groups, and a tendency of gradual increase was observed in both boys and girls as the age group became older.

The negative group that combined "not applicable" and "rarely applicable" accounted for 41.0% in boys and 26.1% in girls, overall.

When compared by school age and gender, the negative ratio was 44.9% in boys and 31.9% in girls at grades 1-2, 40.7% in boys and 26.9% in girls at grades 3-4, 40.4% in boys and 27.0% in girls at grades 5-6, 39.9% in boys and 23.7% in girls at junior high school, and 39.5% in boys and 22.5% in girls at senior high school. The percentages of the answers that suggest negativity was always higher in boys than in girls in all school age groups. The negative ratio was around 40% in boys, and the it tended to gradually decrease in higher age groups in both boys and girls.

Compared with the last survey, the negative ratio in boys was 2.2% lower overall; it was 0.8% lower for grades 1-2, 0.1% lower for grades 3-4, 0.4% lower for grades 5-6, 6.7% lower for junior high school, and 0.3% higher for senior high school boys. For girls, it was 2.4% lower overall, 1.9% higher for grades 1-2, 1.3% lower for grades 3-4, 4.1% lower for grades 5-6, 4.8% lower for junior high school, and 0.1% lower for senior high school girls. Compared with the last survey, the drop in the negative ratio in junior high school students was notable in both boys and girls.

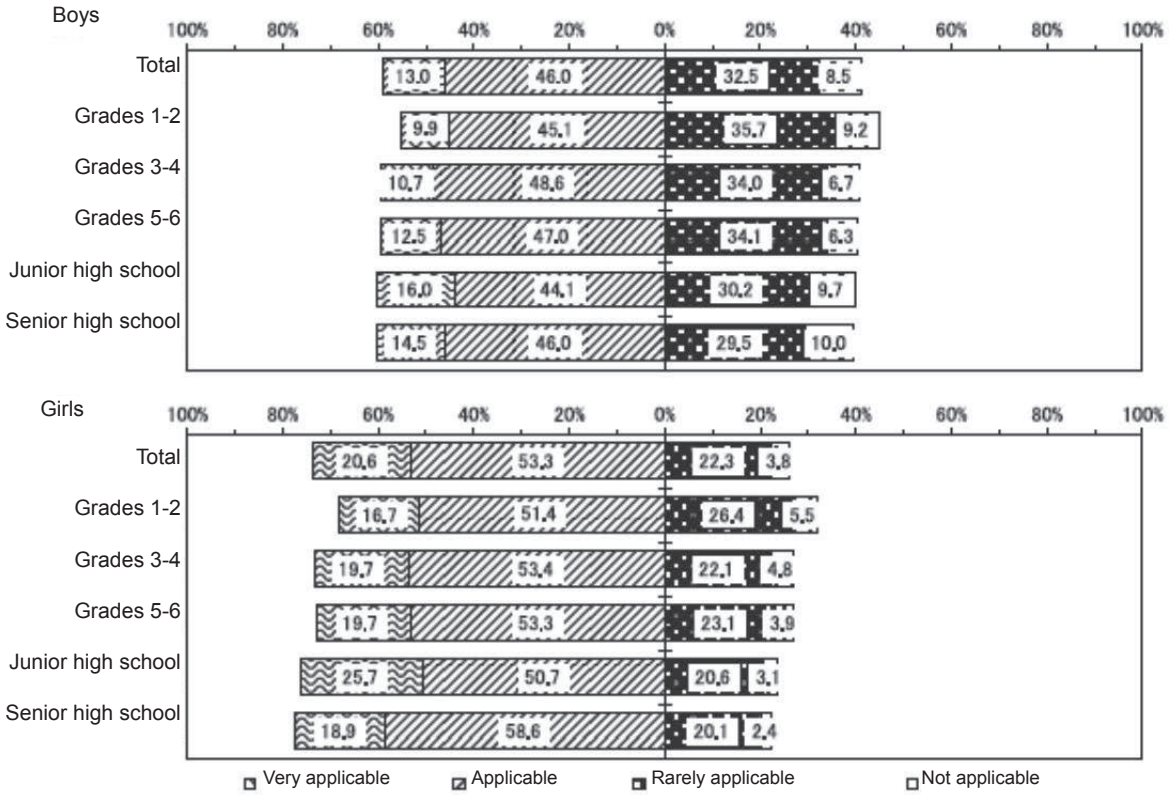


Figure 6-2-14 I tend to willingly help my friend who is feeling depressed due to a problem or feeling obnoxious

2.7 "Feeling of self-esteem" item in Q35.8 and Q35.9

Q35.8 "I have few things I can boast"

The positive group that combined "Very applicable" and "Applicable" accounted for 36.4% in boys and 39.9% in girls, overall.

When compared by school age and gender, the positive ratio was 21.1% in boys and 19.8% in girls at grades 1-2, 27.3% in boys and 26.5% in girls at grades 3-4, 27.4% in boys and 27.0% in girls at grades 5-6, 47.3% in boys and 56.4% in girls at junior high school, and 54.2% in boys and 60.7% in girls at senior high school.

The positive ratio was slightly higher in boys than in girls at elementary school; but it was higher in girls than in boys at junior and senior high schools. The rise was especially notable at junior and senior high schools who fill out the answer themselves, reaching as high as around 50%, particularly for senior high school girls at over 60%.

Less girls answered "Not applicable" than boys, accounting for 19.4% in junior high school boys, 17.0% in senior high school boys, 12.0% in junior high school girls, and 9.8% in senior high school girls.

Compared with the last survey, the positive ratio in boys was 2.6% higher overall; it was 1.4% higher for grades 1-2, 4.9% higher for grades 3-4, 2.3% higher for grades 5-6, 0.8% lower for junior high school, and 0.8% lower for senior high school boys. For girls, it was 2.3% higher overall, 1.7% higher for grades 1-2, 3.6% higher for grades 3-4, 4.4% lower for grades 5-6, 3.3% higher for junior high school, and 2.8% lower for senior high school girls.

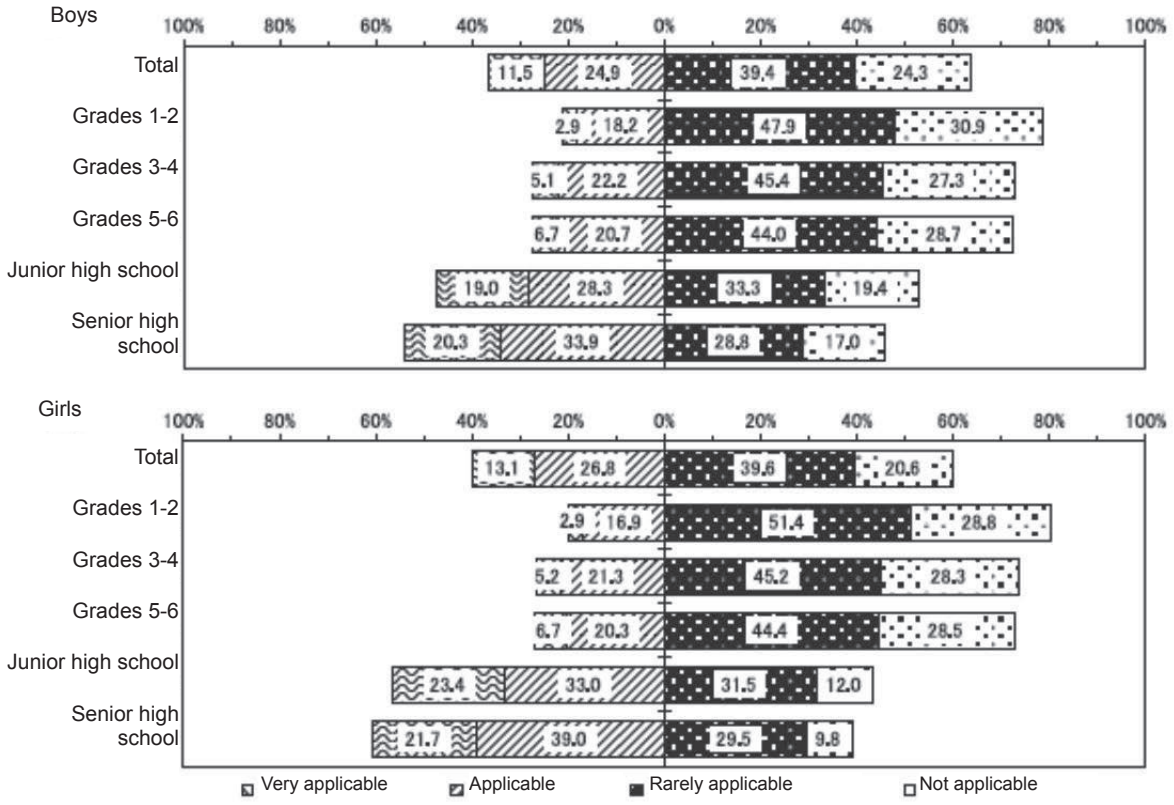


Figure 6-2-15 I have few things I can boast

Q35.9 “Sometimes I feel I am good for nothing”

The positive group that combined “very applicable” and “applicable” accounted for 22.3% in boys and 26.7% in girls, overall.

When compared by school age and gender, the positive ratio was 8.4% in boys and 7.8% in girls at grades 1-2, 10.9% in boys and 8.1% in girls at grades 3-4, 12.7% in boys and 11.4% in girls at grades 5-6, 35.1% in boys and 46.6% in girls at junior high school, and 39.0% in boys and 49.1% in girls at senior high school.

The positive ratio increased with increasing age in both boys and girls. Boys tends to be somewhat higher than girls at elementary school; however, it becomes higher in girls than in boys of junior and senior high schools, and the rise at junior and senior high schools was high in both boys and girls. About half of junior and senior high school girls answered that “Sometimes I feel I am good for nothing,” and even the answer of “Very applicable” alone occupied 18.7% and 18.4% at junior and senor high schools, respectively.

The answer “Not applicable” accounted for 31.7% in junior high school boys, 19.3% in junior high school girls, 25.1% in senior high school boys, and 19.0% in senior high school girls.

A “feeling of self-esteem” is about a self-awareness including respect and acceptance of oneself, and it is considered to be deeply associated with social and mental adaptiveness as the sense and feeling of worthiness and ability of oneself. The drop in the feeling of self-esteem became stronger at junior and senior high schools in both boys and girls as the age group became older, with girls being dominant.

Compared with the last survey, the positive ratio in boys was 0.9% higher overall; it was 1.7% higher for grades 1-2, 0.2% higher for grades 3-4, 0.4% higher for grades 5-6, 0.8% lower for junior high school, and 3.6% lower for senior high school boys. For girls, it was 0.4% higher overall, 2.2% higher for grades 1-2, 1.6% lower for grades 3-4, 1.9% lower for grades 5-6, 0.1% lower for junior high school, and 6.8% lower for senior high school girls. Compared with the last survey, the decrease in the positive ratios for both boys and girls of high school was large, especially for senor high school girls that decreased by 6.8%.

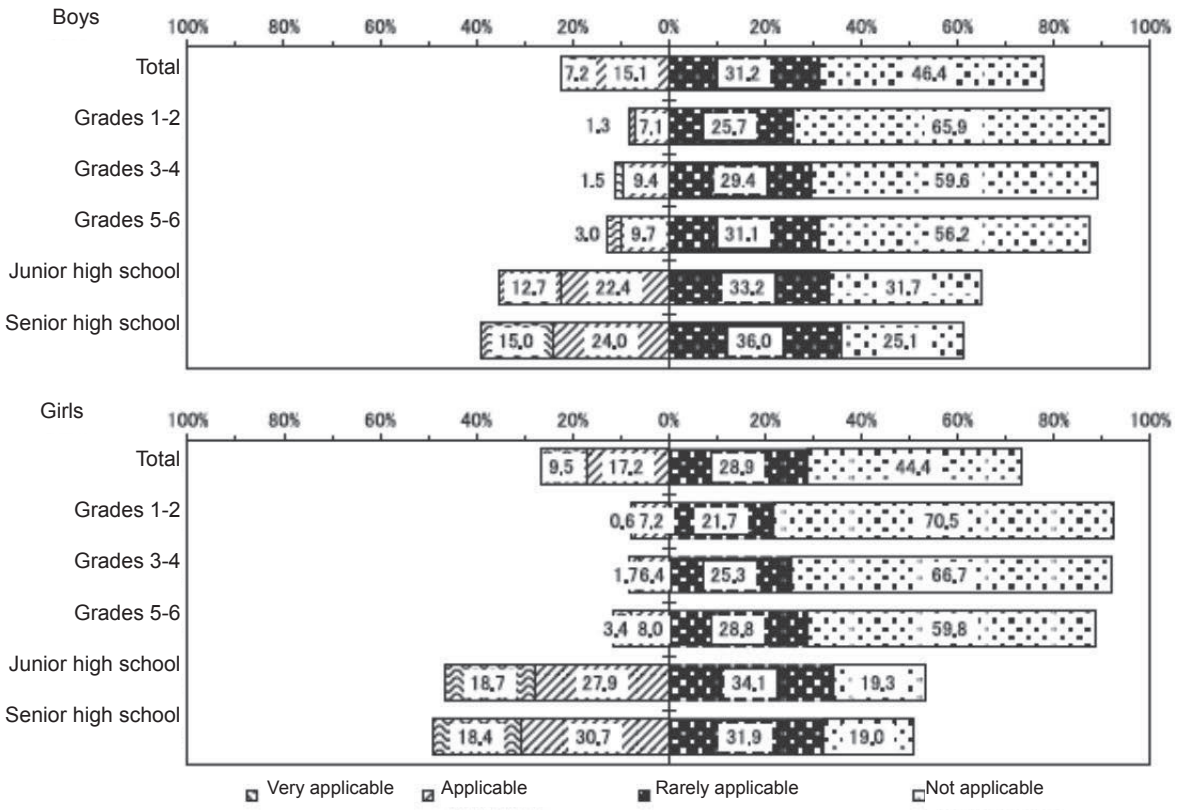


Figure 6-2-16 Sometimes I feel I am good for nothing

2.8 "Suppressed anxiety" item in Q35.10 and Q35.11

Q35.10 I give up quickly when I think of doing something because I feel I won't be able to do it

The positive group that combined "very applicable" and "applicable" accounted for 31.5% in boys and 31.7% in girls, overall.

When compared by school age and gender, the positive ratio was 26.6% in boys and 21.2% in girls at grades 1-2, 30.5% in boys and 22.2% in girls at grades 3-4, 29.7% in boys and 24.8% in girls at grades 5-6, 34.2% in boys and 41.1% in girls at junior high school, and 34.9% in boys and 44.3% in girls at senior high school.

The positive ratio was higher in boys than in girls during the elementary school period; but it was higher in girls than in boys at junior and senior high schools. For elementary school girls, it tended to gradually increase as the age group became older. The positive ratio increased for junior and senior high school students who answer the questions themselves, reaching about 35% in boys and 40% or higher in girls of junior and senior high schools.

Compared with the last survey, the positive ratio in boys was 2.3% lower overall; it was 0.2% higher for grades 1-2, 6.3% higher for grades 3-4, 3.9% higher for grades 5-6, 1.4% higher for junior high school, and 3.2% lower for senior high school boys. For girls, it was 0.6% higher overall, 4.0% higher for grades 1-2, 0.5% lower for grades 3-4, 2.8% lower for grades 5-6, 0.5% lower for junior high school, and 1.6% lower for senior high school girls.

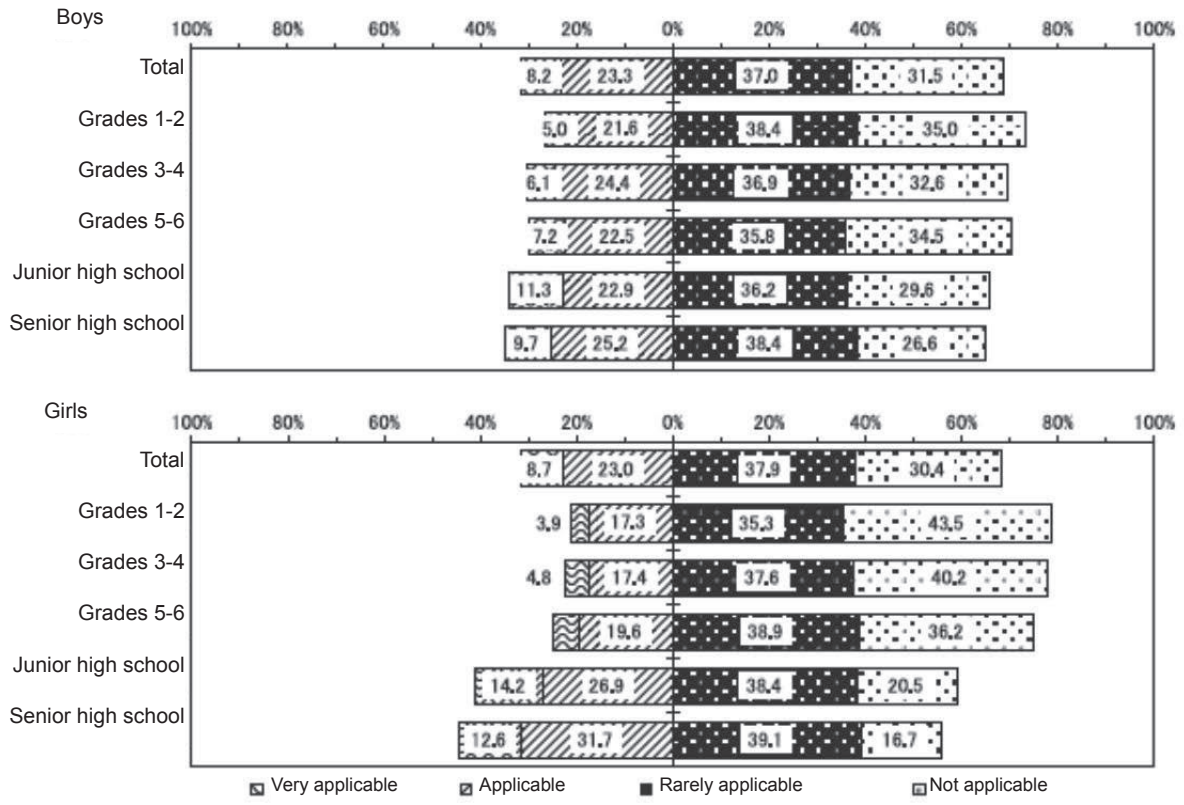


Figure 6-2-17 I give up quickly when I think of doing something because I feel I won't be able to do it

Q35.11 "I get tense and cannot relax all the time"

The positive group that combined "very applicable" and "applicable" accounted for 11.5% in boys and 11.5% in girls, overall.

When compared by school age and gender, the positive ratio was 4.6% in boys and 4.2% in girls at grades 1-2, 6.8% in boys and 4.7% in girls at grades 3-4, 6.4% in boys and 7.0% in girls at grades 5-6, 17.7% in boys and 19.1% in girls at junior high school, and 18.9% in boys and 18.8% in girls at senior high school.

The positive ratio remained almost unchanged among elementary school grades for boys. It increases in value for both boys and girls of junior and senior high school students who answer the question themselves. The positive ratio was 17.7% for junior high school boys and stayped about the same at about 19% for junior high school girls and senior high school boys and girls. The answer "Very applicable" accounted for 5.9% and 5.6% in junior high school boys and girls and 5.4% and 4.7% in senior high school boys and girls, respectively; it was somewhat low for senior high school girls.

Compared with the last survey, the positive ratio in boys was 1.1% higher overall; it was 0.8% lower for grades 1-2, 1.9% higher for grades 3-4, 0.8% higher for grades 5-6, 1.6% higher for junior high school, and 3.0% lower for senior high school boys. For girls, it was 1.3% higher overall, 0.6% higher for grades 1-2, 0.6% lower for grades 3-4, 0.3% lower for grades 5-6, 2.3% higher for junior high school, and 1.4% higher for senior high school girls. Compared with the last survey, the positive ratio was slightly higher for junior and senior high school girls but was lower for senior high school boys by 3.0%.

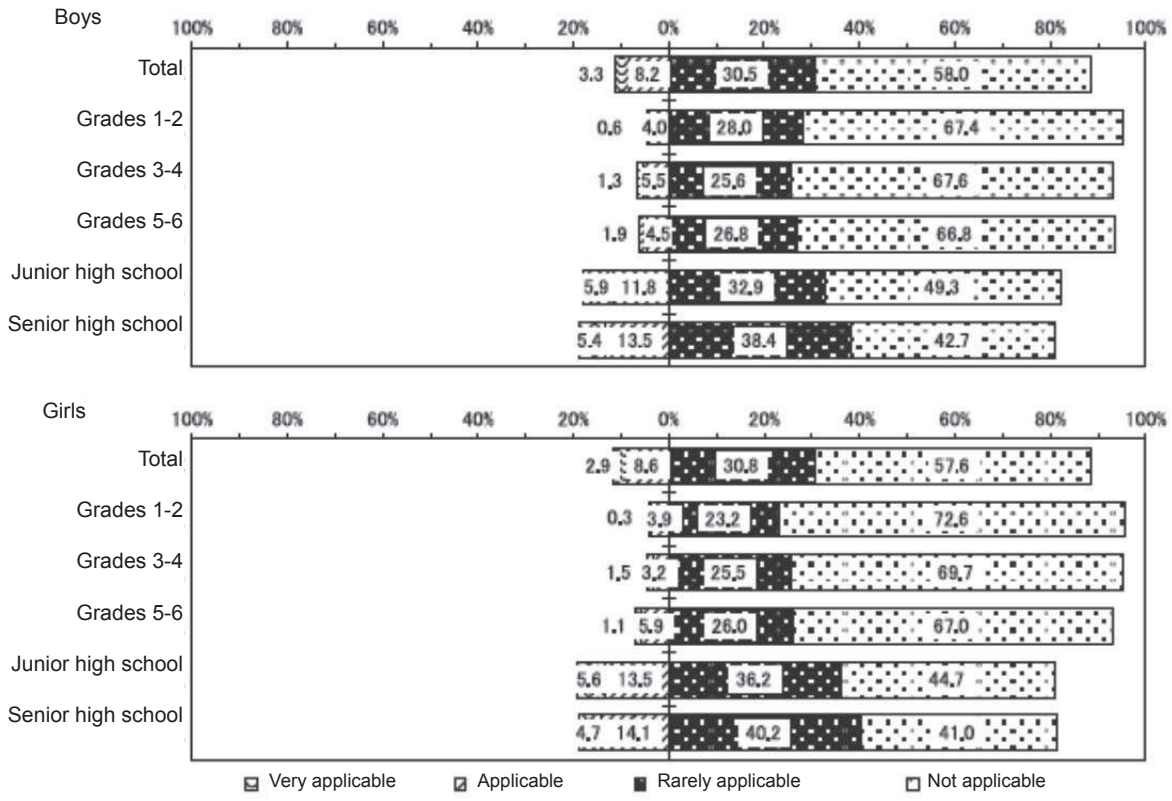


Figure 6-2-18 I get tense and cannot relax all the time

2.9 Subjective symptoms relating to "trend of temper dysregulation"

The positive ratio in *the trend of temper dysregulation*, which has been regularly evaluated in this surveillance study, is examined here. It is intended to evaluate the symptoms related to the mood and emotional aspects that manifest when "depressed mental state" is in the background by referring to the DMS's depression diagnosis algorithm, even though this survey was a paper-based investigation.

The *trend of temper dysregulation* was evaluated based on 8 items in total from the items 1 through 6 in Q34 and items 1 and 2 in Q35. There are 4 levels of answers available to indicate the presence of relevant symptoms, ranging from "Often (about once a week),", "Occasionally (about once a month),""Rarely (less than once a month)," to "No" for Q34 and from "Very applicable,""Applicable,""Rarely applicable," to "Not applicable" for Q35; "Often" and "Occasionally" in Q34 and "Very applicable" and "Applicable" in Q35 were grouped together as the positive group in each question to evaluate the positiveness or negativeness in the *trend of temper dysregulation* according to a flow-chart shown in Figure 6-2-19.

The resulted positive ratio in this survey was 1.0% in boys and 1.2% in girls at grades 1-2, 1.6% in boys and 1.4% in girls at grades 3-4, 1.7% in boys and 1.2% in girls at grades 5-6, 6.4% in boys and 9.1% in girls at junior high school, and 7.1% in boys and 9.5% in girls at senior high school. It tended to be low for elementary school children and become higher for junior and senior high school students.

The positive ratio was about the same for boys and girls of grades 1-2 and then for grades 3-4, a little higher in boys than in girls in grades 5-6, and higher in girls than in boys at junior and senior high schools.

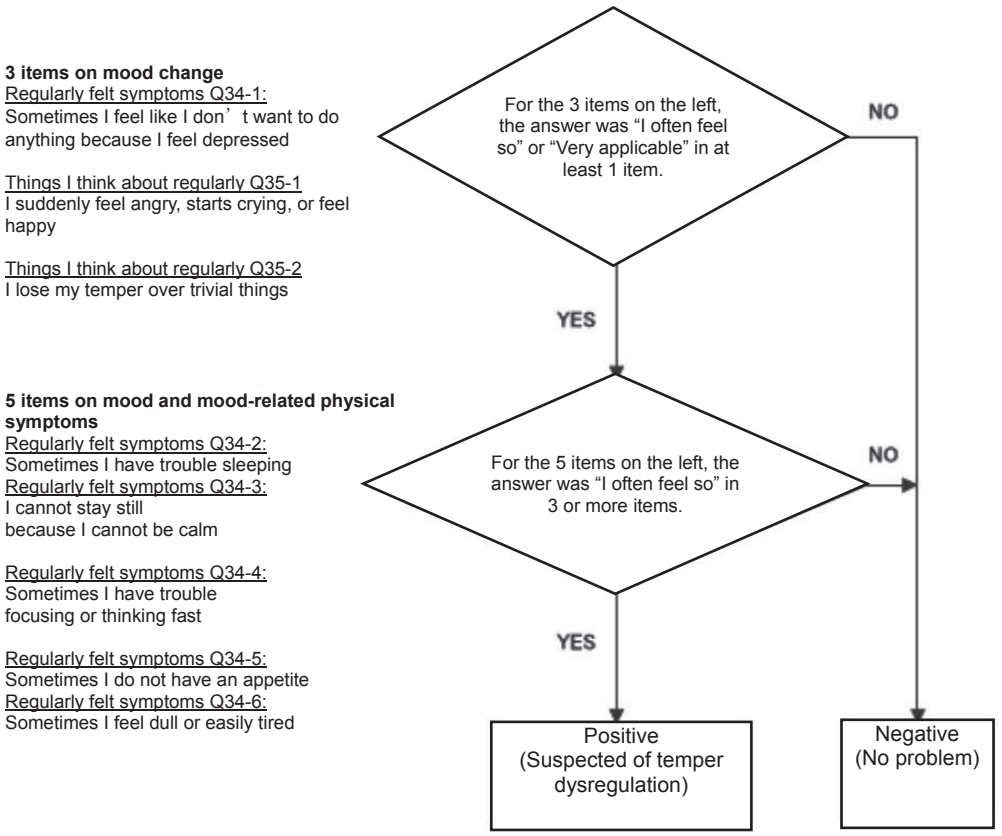


Figure 6-2-19

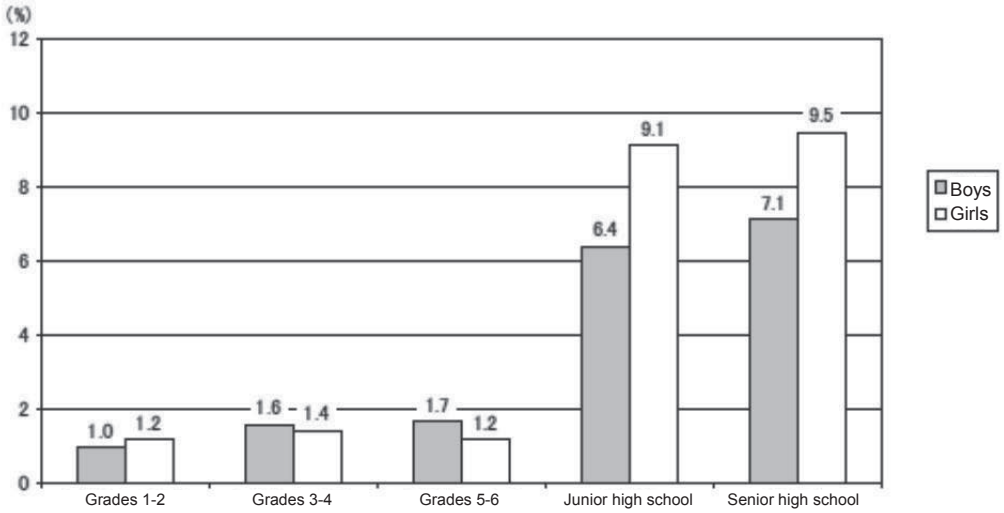


Figure 6-2-20 Positive ratio for the trend of temper dysregulation

Subjective symptoms relating to the "trend of temper dysregulation" – Disaster-affected areas

The result on the *trend of temper dysregulation* in disaster-affected areas is as follows. The percentages were 0.0% in boys and 3.5% in girls at grades 1-2, 0.7% in boys and 1.1% in girls at grades 3-4, 0.8% in boys and 0.8% in girls at grades 5-6, 7.7% in boys and 10.1% in girls at junior high school, and 6.4% in boys and 13.0% in girls at senior high school. Compared to the overall result (Figure 6-2-20), grades 1-2 girls were higher at 3.5%, and the positive ratios for junior high school boys and girls and senior high school girls were higher than that of the overall ratio, but it was rather lower for elementary school grades except for the grades 1-2 girls and for senior high school boys. The trend of temper dysregulation in the populations of disaster areas was more evident among junior and senior high school girls at over 10%.

The positive ratio was low in senior high school boys and among elementary school groups except the grades 1-2 girls was lower than those of overall results, but it is possible that the small number of senior high school targets and the time that has passed since the disaster have affected the results.

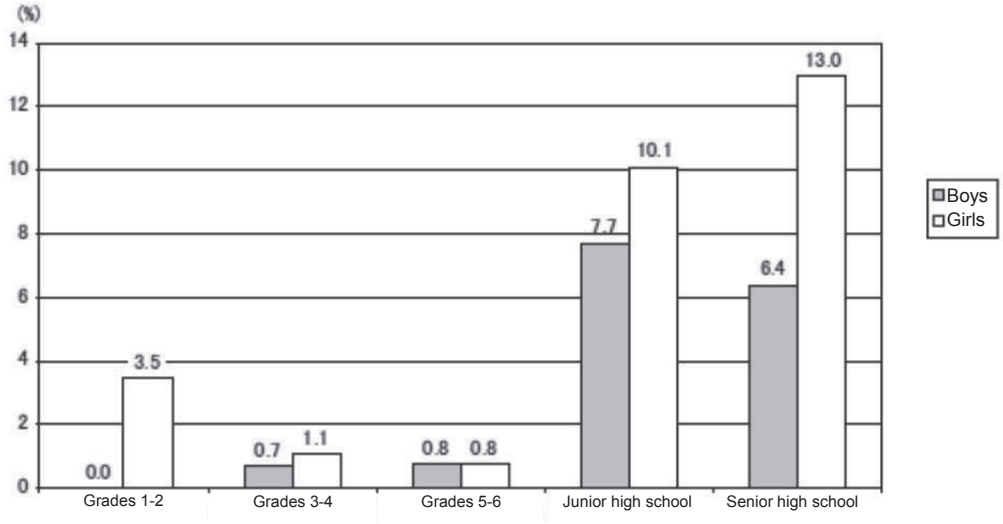


Figure 6-2-21 Positive ratio of the subjective symptoms relating to the trend of temper dysregulation (disaster-affected area)

3 Results including cross examination

3.1 Cross-tabulation with the body style

In the cross-analysis of mental health items and the Body Style 3 group, the following items were statistically significant (p<0.05).

Cross-tabulation of the 3 body styles (obese, standard, and thin) and Q34

Question Items	Significance	
	Boys	Girls
1. Sometimes I feel like I don't want to do anything because I feel depressed	0.254	0.000*
2. Sometimes I have trouble sleeping	0.035*	0.023*
3. I cannot stay still because I cannot be calm	0.102	0.001*
4. Sometimes I have trouble focusing or thinking fast	0.291	0.024*
5. Sometimes I do not have an appetite	0.000*	0.072
6. Sometimes I feel dull or easily tired	0.751	0.007*
7. Sometimes I think I want to die	0.569	0.000*

Cross-tabulation of the 3 body styles (obese, standard, and thin) and Q35

Question Items	Significance	
	Boys	Girls
1. I suddenly feel angry, starts crying, or feel happy	0.175	0.051
2. Sometimes I lose my temper over trivial things	0.019*	0.020*
3. Sometimes I have gotten into a quarrel or fight with other children , or bullied animals	0.088	0.032*
4. I have been bullied or teased by other children	0.000*	0.000*
5. More than being with other children, I prefer to be alone and often spend time playing alone	0.018*	0.001*
6. I often pay attention to other people's feelings	0.068	0.014*
7. I tend to willingly help my friend who is feeling depressed due to a problem or feeling obnoxious	0.027*	0.081
8. I have few things I can boast	0.001*	0.001*
9. Sometimes I feel I am good for nothing	0.023*	0.000*
10. I give up quickly when I think of doing something because I feel I won't be able to do it	0.000*	0.000*
11 I get tense and cannot relax all the time	0.075	0.007*

In Q34, two items were significant in boys (Q34.2 “Sometimes I have trouble sleeping [depression]” and Q34.5 “Sometimes I do not have an appetite [depression]”). In Q35, 6 items were statistically significant (Q35.2 “Sometimes I lose my temper over trivial things [behavior]), Q35.4 “I have been bullied or teased by other children [friends]), Q35.7 “I tend to willingly help my friend who is feeling depressed due to a problem or feeling obnoxious [prosociality]),” Q35.8 “I have few things I can boast [feeling of self-esteem],” Q35.9 “Sometimes I feel I am good for nothing [feeling of self-esteem],” and Q35.10 “I give up quickly when I think of doing something because I feel I won’t be able to do it [suppressed anxiety]).

In girls, the items other than Q34.5 “Sometimes I do not have an appetite” (depression), Q35.1 “Sometimes I suddenly feel angry, starts crying, or feel happy” (emotions), Q35.3 “I have gotten into a quarrel or fight or bullied other children” (behavior), and Q35.7 “I tend to willingly help my friend who is feeling depressed due to a problem or feeling obnoxious” (friends) were all statistically significant (p<0.05). To note, the statistical significance for Q35.1 was 0.051.

In Q34.7 “Sometimes I do not have an appetite,” it was only statistically significant only in girls. Q35.1 “Sometimes I suddenly feel angry, starts crying, or feel happy” was not statistically significant in neither boys nor girls.

This cross-examination revealed that the influence of body style was statistically significant in many items, especially in the obese group and particularly among girls.

3.2 Cross-tabulation of the disaster-affected areas and not-disaster-affected areas

A cross-analysis of the results between the disaster-affected areas -- mainly the Miyagi prefecture -- and the not-affected areas was performed as a way to estimate the effect of the Great East Japan Disaster in the investigation of this surveillance project.

This time, there was no statistically significant items between the disaster-affected areas and the non-affected areas in both boys and girls in the cross-tabulation for all age groups.

Cross-tabulation of Q34’s result between the disaster-affected areas and not-affected areas

Question Items	Significance	
	Boys	Girls
1. Sometimes I feel like I don’t want to do anything because I feel depressed	0.293	0.210
2. Sometimes I have trouble sleeping	0.714	0.308
3. I cannot stay still because I cannot be calm	0.653	0.085
4. Sometimes I have trouble focusing or thinking fast	0.769	0.367
5. Sometimes I do not have an appetite	0.147	0.250
6. Sometimes I feel dull or easily tired	0.461	0.588
7. Sometimes I think I want to die (answered by junior and senior high school students only)	0.517	0.234

Cross-tabulation of Q35’s result between the disaster-affected areas and not-affected areas

Question Items	Significance	
	Boys	Girls
1. I suddenly feel angry, starts crying, or feel happy	0.802	0.044
2. Sometimes I lose my temper over trivial things	0.179	0.371
3. Sometimes I have gotten into a quarrel or fight with other , or bullied animals	0.724	0.567
4. I have been bullied or teased by other children	0.109	0.036
5. More than being with other children, I prefer to be alone and often spend time playing alone	0.500	0.225
6. I often pay attention to other people’s feelings	0.096	0.372
7. I tend to willingly help my friend who is feeling depressed due to a problem or feeling obnoxious	0.069	0.317
8. I have few things I can boast	0.187	0.691
9. Sometimes I feel I am good for nothing	0.359	0.198
10. I give up quickly when I think of doing something because I feel I won’t be able to do it	0.414	0.299
11. I get tense and cannot relax all the time	0.675	0.637

4 Annual change

The change over time in the positive ratio for *the trend of temper dysregulation* was examined. It should be noted that the result from HY2002 was excluded in the review because the number of options available in some questions were different. Until the last survey, the positive ratio continued to increase for

junior and senior high school students at each survey, reaching 9.2% in senior high school boys and 8.8% in senior high school girls. In addition, the positive ratio was higher in boys than in girls at grades 3-4 and grades 5-6 and higher in girls than in boys at junior high school since the FY2006 survey. For senior high school students, it was higher in boys than in girls in the last survey of FY2012. This time, the positive ratio in senior high school girls reached 9.5%, which is the highest ever observed so far, suggesting that a tendency of increase over years is still exists. The value for junior high school girls was 9.1%, which is the same as the last survey, but a tendency of gradual increase over years is maintained.

The positive ratio for senior high school boys decreased for the first time, to 7.1%. The drop in the positive ratio compared to the last survey was also observed in other age groups; it decreased from 2.5% to 1.7% in grades 5-6 boys and from 7.4% to 6.4% in junior high school boys. For girls, it dropped from 1.5% to 1.2% in grades 5-6 girls. Moreover, in grades 3-4 girls that had been showing a tendency of gradual decrease since FY2008, the positive ratio rose from 0.6% to 1.4% this time.

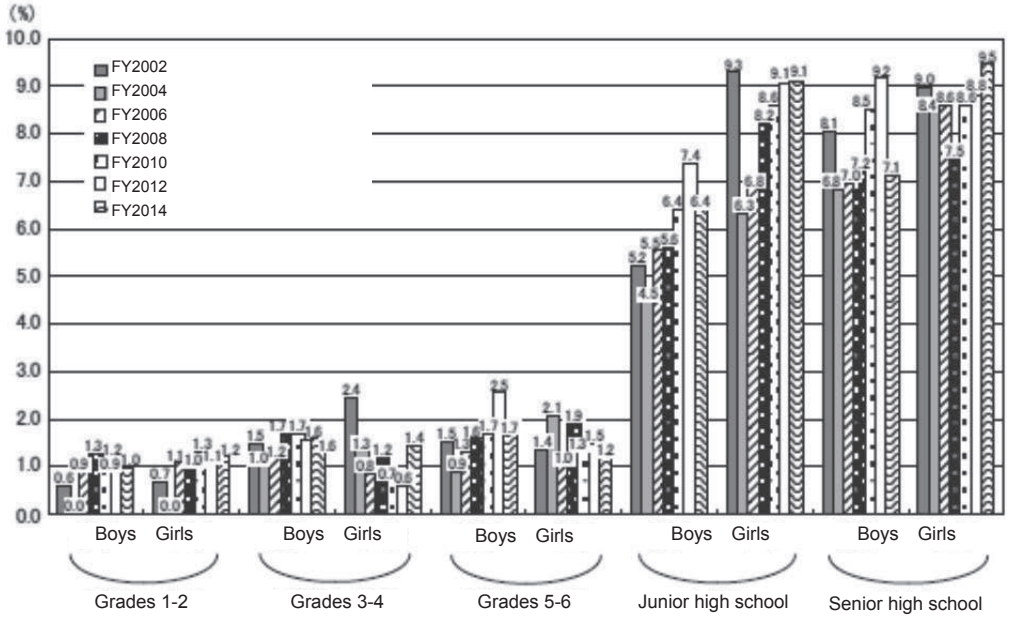


Figure 6-4-1

5 Summary

All items were answered by the parents at home for elementary school children whereas they were answered by the students themselves at school for junior and senior high school students; therefore, the results of the survey is a reflection of the range of observation of the parents for elementary school children and the status of students themselves for junior and senior high school students.

For junior and senior high school students who answered the questions themselves, the positive answers of "Very applicable" and "Applicable" became more common in many items such as *depression* or *feeling of self-esteem*, and the positive ratio tended to be higher in girls than in boys.

In the *hyperactivity* item, the positive ratio became lower in higher age groups, but the value increased for junior and senior high school students who answered the questions themselves. The positive ratio was generally higher in boys than in girls; however, it was higher in girls than in boys at junior and senior high school for Q34.4 "Sometimes I have trouble focusing or thinking fast." In addition, the positive ratio had increased more in senior high school students than in junior high school students in the last survey, but the range of increase was lower for senior high school students than for junior high school students this time. A similar phenomenon was also observed in Q34.3 "I cannot stay still because I cannot be calm" (hyperactivity), Q35.1 "Sometimes I suddenly feel angry, starts crying, or feel happy" (emotions), and Q35.2 "Sometimes I lose my temper over trivial things" (behavior).

The positive ratio also rose as the age group became older in the *feeling of self-esteem*, and it was higher in girls than in boys.

The cross-tabulation with the body type showed that both boys and girls in the obese group are influenced emotionally such as being patient, indicating that it is related to many mental aspects such as

having experienced a bullying or teasing and having a sense of isolation and lower sense of self-esteem. The influence of the body style was more evident in girls, including an associated depression.

In the *trend of temper dysregulation*, the rise in the positive ratio was observed in senior high school girls, but the value remained the same for junior high school girls; it decreased in grades 5-6 and junior and senior high school boys.

In the examination of the disaster-affected areas and not-affected areas, boys and girls of junior high school and senior high school girls had higher positive ratios than the overall value in the *trend of temper dysregulation*, however, there was no statistically significant item in the cross-tabulation between the disaster areas and non-affected areas.

Chapter 7 Overview of Survey Results on Allergy Symptoms

1. Introduction

The survey items for allergy symptoms have been changed significantly compared to the last survey in FY2002.

The amendment is intended to bring light to the prevalence of typical allergy disease based on proper diagnosis and the status of school life management and the reality, and to clarify the status of bronchial asthma management and the reality of anaphylaxis among school children and students The changes were made with the awareness of the purpose to help school to decide their response policy and serve as the indicator of the reality of allergic disease among school children and students in Japan.

The questionare on the restricted school life due to atopic dermatitis was removed and Q1-2 "Status of drug administration for bronchial asthma. The last survey also included an investigation of "whether or not the response of a school to allergy was based on professional instruction" by a physician; this time, the target of Q1-4 "whether or not the response of a school to allergy was based on physician's instruction" was changed to the parents who answered that their child has been diagnosed as having a food allergy and the child has been treated or cared because the allergy that actually poses a problem at school is food allergy.

Any mention of the previous surveys is referring to the ones before the last survey and older.

1) Current and past prevalences of allergic disease based on professional diagnosis and the school support

[Target] All parents

[Purpose] The survey investigated the prevalence and medical history based on physicians' diagnosis and the management status in current school life for allergic diseases that pose a problem at school (bronchial asthma, atopic dermatitis, food allergy, allergic rhinitis [including pollinosis], allergic conjunctivitis [including pollinosis], cedar pollen allergy, sick building syndrome, bee venom allergy, etc.).

[Point] The accuracy in conclusion of each disease prevalence is improved by asking the parents to answer questions based on physicians' diagnosis rather than their subjectivity. The allergic diseases surveyed were selected to cover those that have been common in the previous surveys and those that a school response is likely wanted. Following how the previous surveyed were done, pollinosis is included in allergic rhinitis and conjunctivitis.

2) Q1-1 Restricted school life due to bronchial asthma

[Target] The parents who answered that "My child has been diagnosed as bronchial asthma by a physician, currently"

[Purpose] The status of restricted school life caused by the worsening of bronchial asthma within the last 12 months was investigated.

[Point] The previous surveys investigated the status of restricted school life due to allergic disease and did not specify as bronchial asthma, so the status of restricted school life for each disease was not available. Since the last survey, the questions specifically asks for bronchial asthma and atopic dermatitis to reveal the characteristics of these diseases in order to help school in their on-site response. It should be noted that the questions on atopic dermatitis was removed this time because the restriction to school life by it was minor according to the last survey's result.

3) Q1-2 Routine treatment status for bronchial asthma [newly added]

[Target] The parents who answered that "My child has been diagnosed as bronchial asthma by a physician, currently"

[Purpose] The current contents of routine treatment for bronchial asthma was investigated.

[Point] The last survey revealed that bronchial asthma among school children and students was managed insufficiently. An investigation on treatment contents will enable to evaluate whether or not proper treatment is provided based on the severity of disease. The status of routinely used drug was investigated for each medication. The product names of major brands were also listed for each drug to help the understanding of respondents.

4) Q1-3 Removing food allergy items and accidental ingestion

[Target] The parents who answered that "My child has been diagnosed as having a food allergy by a physician, currently"

[Purpose] The status of removing specific food items that cause allergy was investigated for those that are

based on professional diagnosis and those that the parents excluded based on their judgment, separately. The status of accidental ingestion was also investigated.
[Point] The accuracy in conclusion is improved by specifying to those that are based on physicians' diagnosis. In addition, an investigation on accidental ingestion enables risk assessment.

5) Q1-4 Investigation of whether or not a school support for food allergy is based on physicians' diagnosis.

[Target] The parents who answered that "My child has been diagnosed as having a food allergy by a physician, currently"
[Purpose] Whether or not a current school support is based on a professional diagnosis by a physician was investigated.
[Point] It is mandatory for school that the support for food allergy provided at school is based on the professional diagnosis by a physician, so, revealing how well school support is grounded on medical evidence can help form a future guideline.

6) Q2 Investigation of bronchial asthma using ISAAC

[Target] All parents
[Purpose] The International Study of Asthma and Allergies in Childhood (ISSAC) is a traditional, international epidemiological study for major allergic diseases including bronchial asthma, so the results of the survey can be more broadly compared or applied by using the survey items of this study.
[Point] The ISSAC questionnaire is internationally standardized, so the results that are obtained using this questionnaire can be examined and compared with other data that used the same questionnaire in and outside of Japan. It is also possible to clarify whether proper diagnosis and care are provided by comparing to school children and students who have been diagnosed as suffering from bronchial asthma in Q1.
The questions ask for the presence and frequency of stridor, frequency of sleep disturbance due to stridor, and frequency of more severe stridor.

7) Q4 Prevalence rates of anaphylaxis and anaphylactic shock

[Target] All parents
[Purpose] The prevalence rates of anaphylaxis and anaphylactic shock was investigated.
[Point] The definition of anaphylaxis or anaphylactic shock is often misunderstood, so the definition of each disease was provided as an annotation in the investigation. *Anaphylaxis* was defined as "a state in which multiple symptoms on skin (urticaria, itching, etc.), mucosa(swollen lips, eye lids, etc.), the respiratory system (coughing, wheezing, etc.), and/or the digestive system (vomiting, diarrhea, abdominal pain, etc.) appear systematically," and *anaphylactic shock* was defined as "a state in which more serious conditions of anaphylactic symptoms appear, such as being listless or semiconscious, having a pale face, or not responding to a call or stimulus."

8) Q5 Status of carrying epinephrine

[Target] All parents
[Purpose] The status of carrying epinephrine auto injector was investigated.
[Point] It is intended to understand the status of carrying epinephrine auto injector over time to help on-site operation of education.

2 Results of each survey item

1) Current and past prevalences of allergic disease based on physicians' diagnosis and the school support

A) Bronchial asthma

a) Prevalence

The overall prevalence was 17.1%; 4.5% (5.5% in boys and 3.4% in girls) were those who are currently diagnosed, and 12.6% were those who were previously diagnosed.

In terms of school ages, the grades 1-2 were the highest at 6.7%; the figure tapered off with age and was down to 2.1% in senior high school students. In terms of gender, the figures were higher until the end of junior high school ages, but there was no gender difference in high school.

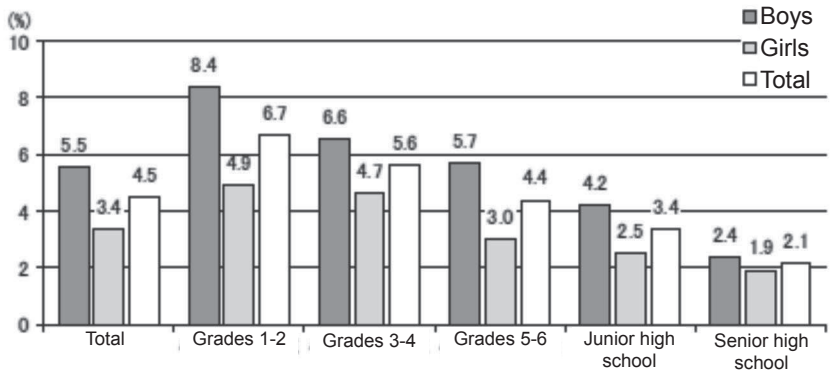


Figure 7-2-1 Prevalence of bronchial asthma

b) Past history

There was no significant difference among school ages in terms of the past diagnosis and varied from 11.0% to 13.7%. The overall prevalence, current and past diagnosis combined, was the highest at 19.1% in grades 1-2; it was 19.3% in grades 3-4, 18.1% in grades 5-6, 15.6% in junior high school, and 13.2% in senior high school. The result shows no tendency of decrease just as in the last survey, but rather an increasing trend was confirmed.

c) School support

It increased from 11.0% of last survey to 14.8%. It was highest for grades 5-6, reaching as high as 19.3%.

It is not likely that the bronchial asthma management has suddenly worsened, so this increase is likely due to a change associated with the School Life Management Instruction Table (For Allergy) becoming popular at schools.

B) Atopic dermatitis

a) Prevalence rate

The overall prevalence was 12.6%; 5.5% (5.8% in boys and 5.2% in girls) were those who are currently diagnosed, and 7.1% were those who were previously diagnosed.

When compared by school age group, the highest was grades 1-2 children at 7.1% and the lowest was junior high school students at 4.3%, and there was a decreasing tendency as age increased. In terms of gender, it was more common in boys than in girls until grades 3-4, but there was no particular trend in older age groups.

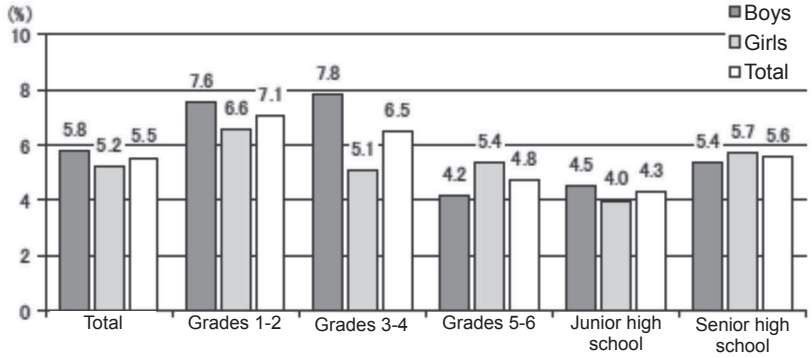


Figure 7-2-2 Prevalence of atopic dermatitis

b) Past history

It was the highest in senior high school students at 8.8%, and grades 1-2 children were the lowest at 5.9%. There was no major difference in the overall prevalence, the current and past diagnosis combined, across school ages; it fluctuated in the range of 11 to 14%. This suggests that atopic dermatitis is not on an increasing trend like bronchial asthma is.

c) School support

Of the atopic dermatitis children, 7.5% of them received school support; no difference was found across school ages, and the figure fluctuated between 6 to 8%. It was about 5-6% in the last survey, so it has risen slightly this time.

C) Food allergy

a) Prevalence rate

The overall prevalence was 7.9%; 2.5% (2.9% in boys and 2.1% in girls) were those who are currently diagnosed, and 5.4% were those who were previously diagnosed.

When compared by school age group, it was high at grades 1-2 and grades 3-4; however, no major change was confirmed with 1.9% at grades 5-6, 2.22% at junior high school, and 2.6% at senior high school. In terms of gender, it was more common in boys than in girls until grades 3-4, but no gender difference was observed in older age groups.

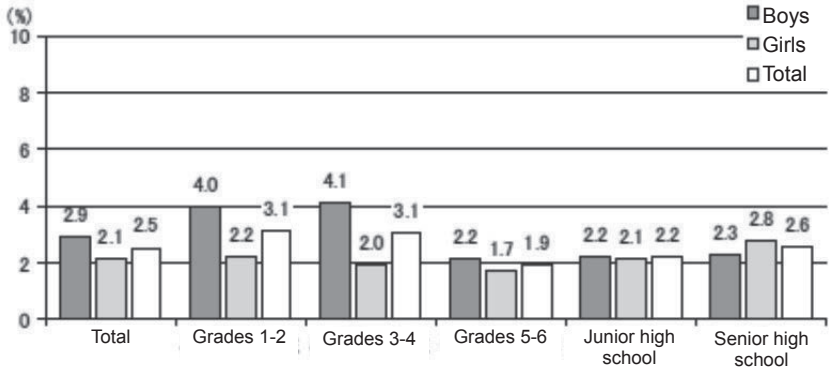


Figure 7-2-3 Prevalence of food allergy

b) Past history

It was the highest in the grades 1-2 at 6.6% and gradually tapered off to 4.3% at senior high school students. The overall prevalence, current and past diagnosis combined, was the highest at 9.8% in grades 1-2, 9.3% in grades 3-4, 7.6% in grades 5-6, 6.6% in junior high school, and 6.8% in senior high school. This shows that food allergy has been on an increasing trend for the last 12 years.

c) School support

Unlike other allergic diseases, the school support ratio was extremely high for each age group. The rate exceeds 100% in some age groups because of wrong answers in part or because some children and students are under school support even without physicians' diagnosis. Even so, the school support ratio for grades 5-6 is 135.8%, which warns a need to investigate and correct the cause. The lowest ratio was 54.6% at senior high school, probably because no school meal service is provided in senior high school.

D) Allergic rhinitis (including pollinosis)

a) Prevalence

The overall prevalence was 29.2%; 16.9% (19.2% in boys and 14.5% in girls) were those who are currently diagnosed, and 12.3% were those who were previously diagnosed.

In terms of school age group, the highest was 18.8% in junior high school, and the lowest was 13.5% in grades 1-2.

So, the prevalence tended to increase with advancing age. In terms of gender, it was more common in boys than in girls.

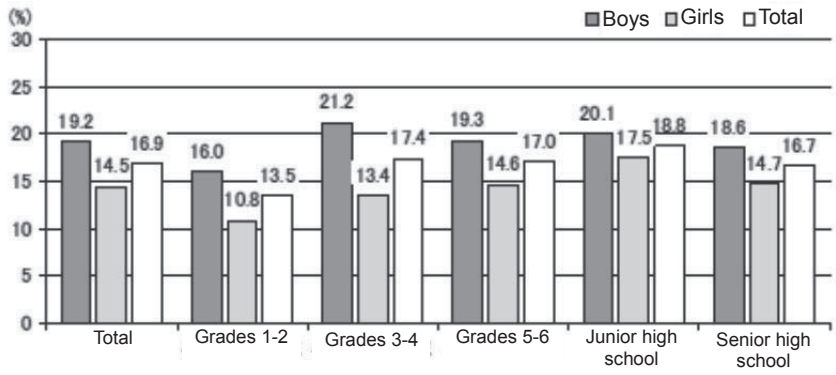


Figure 7-2-4 Prevalence of allergic rhinitis (including pollinosis)

b) Past history

It was the highest in senior high school students at 14.9%, and grades 1-2 children were the lowest at 8.0%. So it tended to increase with age. The total of the current and past diagnosis was the highest in junior high school at 33.5%. It was the lowest in grades 1-2 at 21.5%, 27.4% in grades 3-4, 30.6% in grades 5-6, and 31.5% in senior high school.

c) School support

Overall, 4.6% were receiving school support. In terms of school age, the lowest was 2.4% in grades 1-2, and the highest was 6.8% in senior high school. The school support ratio becomes higher with advancing age, suggesting an increase in severity of the disease.

E) Allergic conjunctivitis (including pollinosis)

a) Prevalence rate

The overall prevalence was 13.2%; 5.9% (6.1% in boys and 5.6% in girls) were those who are currently diagnosed, and 7.3% were those who were previously diagnosed.

In terms of the school age group, the highest was 6.9% at grades 5-6; however, the difference among school ages was about 5-7% and showed no major change. In terms of gender difference, it was more common in boys than in girls up to grades 3-4, but no difference was observed in older groups.

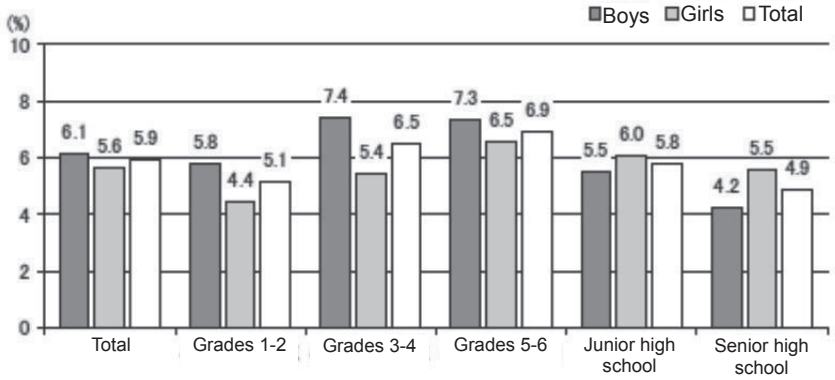


Figure 7-2-5 Prevalence of Allergic conjunctivitis (including pollinosis)

b) Past history

It was the lowest in grades 1-2 at 5.6%, and other school age groups remained around 7%. The total of the past and current diagnosis also remained within 11-15%, and a difference among school ages was small with no particular tendency. This suggest that the disease is more or less stable recently.

c) School support

Overall, 6.2% were receiving school support. The highest was10.2% at senior high school, and it tended to increase as school age advanced; this suggests an increase in severity of the disease.

F) Cedar pollen allergy

a) Prevalence rate

The overall prevalence was 13.3%; 9.3% (10.0% in boys and 8.6% in girls) were those who

are currently diagnosed, and 4.0% were those who were previously diagnosed.

In terms of school ages, the lowest was 6.7% at grades 1-2, and the value remained around 10% for grades 3-4 and up. In terms of gender difference, it was more common in boys than in girls up to grades 5-6, but no gender difference was observed in older groups.

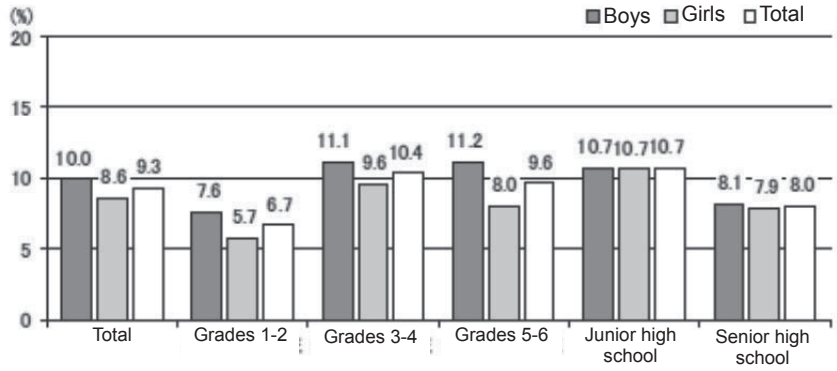


Figure 7-2-6 Prevalence of cedar pollen allergy

b) Past history

There was no major change with age, and it fluctuated in the range of 2.5 to 4.9%. The total of the past and current diagnosis was 9.1% at grades 1-2, 13.8% at grades 3-4, 14.5% at grades 5-6, 15.6% at junior high school, and 11.4% at senior high school. This time, an increasing trend that has been shown in some recent surveys was not observed.

c) School support

Overall, 5.5% were receiving school support. The highest was 8.0% at senior high school, and other school ages remained in the range of 4-5%.

G) Others

The prevalence of sick building syndrome was 0.8%, 16.2% of which received school support, and the prevalence of the bee venom allergy was 0.1%.

H) Summary

a) Prevalence rate

The prevalence of allergic rhinitis (including pollinosis) was the highest at 16.9%, followed by cedar pollen allergy at 9.3%, allergic conjunctivitis (including pollinosis) at 5.9%, atopic dermatitis at 5.5%, bronchial asthma at 4.5%, and food allergy at 2.5%. There was no disease that has considerably changed compared with the last survey.

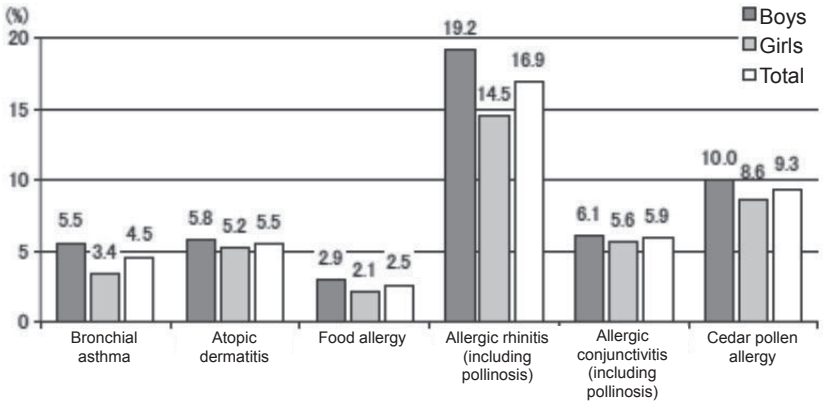


Figure 7-2-7 Disease-specific prevalence

In terms of gender difference, boys were dominant in bronchial asthma (5.5% in boys and 3.4% in girls), allergic rhinitis (5.5% in boys and 3.4% in girls), cedar pollen allergy (10.0% in boys and 8.6% in girls), and no evident gender difference was observed in atopic dermatitis (5.8% in boys and 5.2% in girls), food allergy (2.9% in boys and 2.1% in girls), and allergic conjunctivitis (6.1% in boys and 5.6% in girls).

In terms of school age groups, they were divided into the disease that gradually decreases with age (bronchial asthma and atopic dermatitis) and the disease that does not change with age (food allergy, allergic rhinitis, allergic conjunctivitis, and pollinosis).

B) School support

The school support ratio for food allergy was extremely high at 100%. It is clear considering that a meal service is provided at school. On the other hand, the school support rates for other allergic diseases were not high in general. It was 14.8% for bronchial asthma, but the support rates for other diseases remained within a range of 4.6-7.5%. In other words, the type of support that school is expected to provide is mainly that for food allergy, and also in part for children with bronchial asthma. However, it should be noted that the school support ratio increased for all diseases compared to the last survey, which suggests that the practice of the School Life Management Instruction Table is improving.

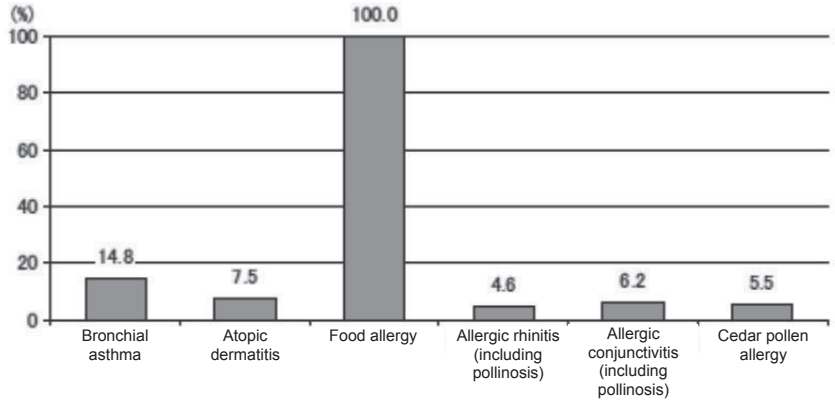


Figure 7-2-8 Status of school support by disease

2) Q1-1 Disruption in school life due to bronchial asthma

For those children who received the diagnosis of bronchial asthma in Q1, any disruption in their school life due to bronchial asthma in the last 12 months was investigated by addressing the questions to their parents.

The result shows that 24.0% of the children with bronchial asthma have been absent from school, 14.1% have been avoided or left early, 24.2% have restricted, 0.7% have missed a day trip, and 0.6% have missed a school trip with overnight stay.

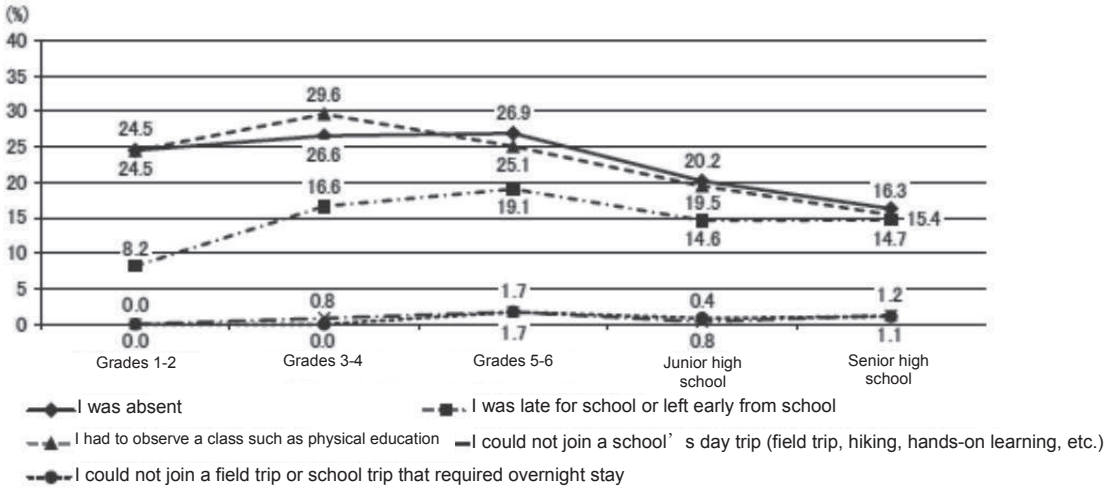


Figure 7-2-9 Has your bronchial asthma caused any disruption in school life?

The absence ratio by school age remained at around 25% in elementary school and showed a decreasing tendency for junior high school and up. Being late for school and leaving early from school was least common in grades 1-2 at 8.2%, and it ranged from 14% to 19% for grades 3-4 and up without any

major change. Observing a class such as physical education was within a range of 25% to 30% with a decreasing tendency, which is similar to the case of being absent from school. The absence ratio and observation ratio suggest that elementary school children are not controlling the condition as well as junior and senior high school students do. However, the awareness for being absent from school or observing a class will probably vary among the parents depending on the child's school age, so it is still too premature to judge.

In the treatment for bronchial asthma, the Japanese Pediatric Guideline for the Treatment and Management of Asthma (2012) indicate that the improvement in quality of life (QOL) (i.e., a child can spend a day normally including sports activity) and the control of the condition (i.e., a child do not show any symptom at day or night) as one of the goals. "Being absent from school" and "being late for school or leaving early from school" in this survey do not align with these goals set in the guideline, and therefore these children have not achieved the treatment goal according to the guideline. The absence ratio and class-observation ratio are as high as 24.0% and 24.2%, respectively, indicating that the control level for bronchial asthma is still insufficient. A similar trend was also shown in the last survey, suggesting that a need to consider a strategy to improve the bronchial asthma control among school children and students in Japan who still continues to exist.

3) Q1-2 Status of routine treatment for bronchial asthma

For those children who received the diagnosis of bronchial asthma in Q1, any drugs that the children were currently using on a regular basis was investigated by addressing the questions to their parents.

A) Steroid inhalants

The user ratio was 42.3%. It was at the 30% level in grades 1-2 and senior high school, which was low compared to other school ages.

B) Leukotriene receptor antagonists

The user ratio was 48.7%. It was at the 50% level in elementary school, 37.1% in junior high school, and down to 22.2% in senior high school.

C) Bronchodilators

a) The patch user ratio was 28.8%.It was high in grades 1-2 and grades 3-4 at the 30% level, but the user ratio decreased as school age advanced.

b) The oral medicine user ratio was 9.4%. It was high in grades 5-6 at 13.0% compared to other school ages.

c) The inhaler user was 16.6%.It ranged from 12.7% to 21.1% among school age groups, but no specific tendency was observed.

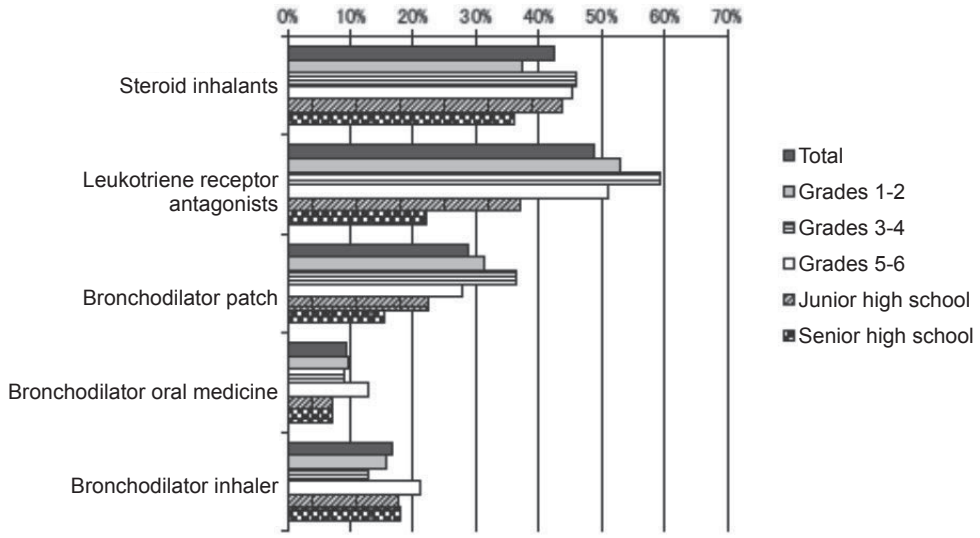


Figure 7-2-10 Status of routine treatment for bronchial asthma (1)

D) Theophylline

The user ratio was 3.7%. It was low in grades 1-2 at 0.7% and increased as school age advanced, but remained at 5-7% in grades 5-6 and up.

E) Intal inhalation

The user ratio was 6.2%. The user ratio declined as school age advanced, down to 4.8% at junior high school and 1.5% at senior high school.

F) Oral steroid drugs

The user ratio was 2.8%. It was high in grades 5-6 at 5.3% compared to other school ages.

G) Others

Those who do not have any regularly taken drugs occupied 17.8%, the Chinese herbal medicine (*kampo*) users was at 1.2%, other drug users was at 5.4%; 0.9% did not the drug they used.

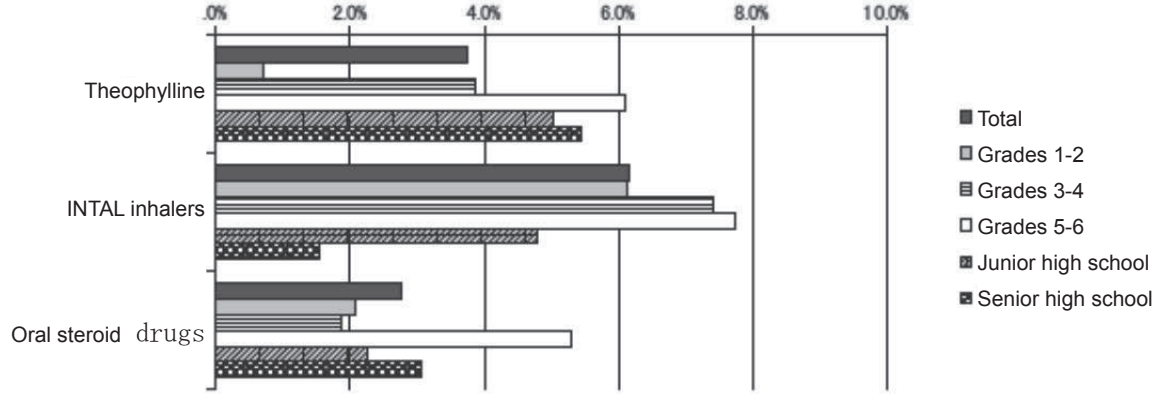


Figure 7-2-11 Status of routine treatment for bronchial asthma (2)

H) Summary

The most commonly used drugs were Leukotriene receptor antagonists and steroids inhalants with over 40%, followed by bronchodilator patches, inhalers, and oral drugs.

Japan society of Pediatric Allergy and Clinical Immunology (JSPACI) conducts a regular survey on the reality and treatment status for bronchial asthma targeting the major pediatric allergy institutions in Japan (note: survey sample of 3,079 in 2014). It can be said that the JSPACI's survey allows understanding the treatment status provided by the leading institutions in pediatric allergy in Japan, whereas this survey by JSSH better reflects the true status of bronchial asthma treatment in Japan. By comparing these two surveys, the following data can be obtained.

Drug name		JSSH survey	JSPACI survey
Steroids Inhalants	Grades 1-2	37.5%	50%
	Grades 3-4	45.8%	
	Grades 5-6	45.5%	
	Junior high school	43.7%	60%
	Senior high school	36.0%	70%
Leukotriene receptor antagonists	Grades 1-2	53.0%	75%
	Grades 3-4	59.4%	
	Grades 5-6	51.0%	
	Junior high school	37.1%	60%
	Senior high school	22.0%	
Bronchodilator patch	Grades 1-2	31.3%	15%
	Grades 3-4	36.3%	
	Grades 5-6	27.7%	
	Junior high school	22.4%	5%
	Senior high school	15.4%	10%
Theophylline	Grades 1-2	0.7%	5%
	Grades 3-4	3.9%	
	Grades 5-6	6.1%	
	Junior high school	5.0%	10%
	Senior high school	5.4%	
Oral steroids	Grades 1-2	2.1%	2%
	Grades 3-4	1.9%	
	Grades 5-6	5.3%	
	Junior high school	2.3%	
	Senior high school	3.1%	4%

The prescription rates of steroid inhalants for grades 1-2 and senior high school was 70% and 50%, respectively, which were especially low compared to the JSPACI survey. The prescription rate of leukotriene receptor antagonists in this survey was generally low across all school ages compared to the JSPACI survey; it was 70-80% for elementary school children and 40-50% for junior and senior high school students. The prescription rate of bronchodilators was generally higher across all school ages in this survey than the JSPACI survey, at about 2-4 times. Theophylline showed no particular trend unlike it did in the JSPACI survey, and the result of steroid oral medicines was similar to that of the JSPACI's.

Assuming that this survey by JSSH does in fact reflects the reality of general clinical practice in Japan better than that by JSPACI, the prescription rates of the 2 major drugs for bronchial asthma treatment -- steroid inhalants and leukotriene receptor antagonists -- were higher in general practitioners than in specialists. This is an insufficient strategy to control the chronic inflammation of the airways, which is the main condition of bronchial asthma. The high prescription rate of bronchodilator patches also support this finding.

The result for oral steroid medicines were not too different from that of the JSPACI; however, this survey investigated "regularly used drugs," and thus it is possible to speculate that 1.9-5.3% of school children and students are using oral steroids regularly, which is a problem of great significance.

4) Q1-3 Food allergy

For those children who received the diagnosis of food allergy in Q1, food items that are removed from the children's diet were investigated by addressing the questions to their parents who care and manage the disease.

A) Food cause-specific estimated prevalence and number of children/students

Food	Removed by physician's instructions			Removed at the parent's discretion	
	Percentage in all food items that cause food allergy	Prevalence in the general population	Estimated number	Prevalence in the general population	Estimated number
Chicken egg	16.4%	0.42%	46,436	0.37%	41,070
Milk	8.7%	0.22%	24,627	0.10%	11,369
Wheat	3.7%	0.09%	10,486	0.00%	402
Shell fish (crustaceans)	11.9%	0.30%	33,713	0.21%	23,746
Fruits	7.7%	0.20%	21,961	0.25%	28,270
Peanuts	17.0%	0.43%	48,214	0.14%	15,092
Buckwheat	14.1%	0.36%	39,904	0.21%	23,667
Nuts	6.3%	0.16%	17,853	0.06%	6,350
Fish	2.8%	0.07%	8,043	0.06%	7,126
Fish egg	7.2%	0.18%	20,488	0.14%	15,671
Sesame seeds	3.3%	0.08%	9,427	0.02%	2,745
Soy	2.3%	0.06%	6,598	0.05%	5,113
Others	10.9%	0.28%	30,822	0.22%	24,377

It was estimated that the peanut, chicken egg, shell fish, milk, fruits, fish egg, and nuts are removed from the diet of over 20,000 children/students based on physician's instructions; and chicken egg, fruits, shell fish, buckwheat are removed from the diet of over 20,000 children/students based on parental discretion. When those that are removed at professional instructions and those removed by parental discretion were compared by the percentages, things other than fruits were removed by professional instructions in many cases. Those that [professional instruction / parental discretion] was 2 or higher, which means that percentage of professional instructions was high, were milk, wheat, peanuts, nuts, and sesame seeds; on the contrary, those that were more often removed by parental discretion were chicken egg, shell fish, fruits, buckwheat, fish, fish egg, and soy.

B) Food cause-specific analysis by school age

a) Removed by physician's instructions

The food items that are removed per physician's instruction belong to either those which prevalence decreases with age (chicken egg, milk, wheat, peanuts, buckwheat, nuts, fish egg, sesame, etc.) and those that do not change (shell fish, fruits, fish, soy, etc.), in large. One possible reason of decreasing prevalence is acquired natural immunity. On the other hand, it is also possible that the prevalence in younger school children is high because the prevalence actually increased in the last 12 years. Continuing investigations through this surveillance project will reveal the true picture.

Food	Removed by physician's instructions (%)				
	Elementary School Grades 1-2	Elementary School Grades 3-4	Elementary School Grades 5-6	Junior high school	Senior high school
Egg	0.73	0.78	0.23	0.23	0.13
Milk	0.46	0.39	0.08	0.09	0.14
Wheat	0.32	0.10	0.00	0.04	0.02
Shell fish (crustaceans)	0.36	0.28	0.16	0.40	0.24
Fruits	0.18	0.28	0.11	0.28	0.06
Peanuts	0.69	0.61	0.50	0.23	0.14
Buckwheat	0.55	0.50	0.30	0.21	0.29
Nuts	0.23	0.24	0.20	0.10	0.02
Fish	0.04	0.11	0.00	0.11	0.09
Fish egg	0.32	0.36	0.07	0.11	0.05
Sesame	0.18	0.03	0.11	0.07	0.00
Soy	0.18	0.05	0.00	0.04	0.03
Others	0.27	0.34	0.37	0.23	0.15

b) Removed at the parent's discretion

The food items that are removed per parental discretion can be divided as those which prevalence increases with age (shell fish, fruits, buckwheat, fish, etc.) or those that decrease (chicken egg, peanuts, nuts, fish eggs, etc.).

Unlike those done by physicians' instructions, certain food items, which are mostly the kinds that are reputed to increase with age, show an increasing tendency. It can be inferred that the children/students or their parents remove those food items at their own discretion without seeking professional consultation because an allergy to fruits is often limited to "oral allergy syndrome," which are often as mild as having a sense of discomfort in the mouth. A future challenge will be to reduce the gap between the prevalence of the patients who remove food items based on physician's instructions and the prevalence of those who remove by the parent's discretion.

Food	Removed at the parent's discretion				
	Elementary School Grades 1-2	Elementary School Grades 3-4	Elementary School Grades 5-6	Junior high school	Senior high school
Egg	0.50	0.58	0.35	0.23	0.21
Milk	0.14	0.13	0.04	0.07	0.17
Wheat	0.00	0.00	0.00	0.01	0.00
Shell fish (crustaceans)	0.18	0.14	0.04	0.30	0.44
Fruits	0.14	0.20	0.08	0.39	0.45
Peanuts	0.19	0.31	0.04	0.10	0.03
Buckwheat	0.18	0.24	0.23	0.16	0.31
Nuts	0.14	0.06	0.00	0.05	0.03
Fish	0.04	0.06	0.00	0.09	0.14
Fish egg	0.32	0.18	0.08	0.05	0.11
Sesame	0.00	0.03	0.04	0.02	0.03
Soy	0.05	0.05	0.04	0.03	0.09
Others	0.18	0.20	0.15	0.19	0.46

5) Q1-4 School support

For those children who received school support for their food allergy, whether the provided support is based on the physician's instructions or not was investigated.

The parents who have submitted professional instructions from physicians, such as the School Life Management Instruction Table (For Allergy), accounted for 38.1%. In terms of school ages, the highest was 58.2% for grades 1-2, and it continued to decrease with age at 44.4% in grades 3-4, 37.3% in grades 5-6, and 28.7% in junior high school. It was only 9.6% in senior high school.

6) Q2 ISAAC Survey

These questions concerning bronchial asthma are based on the ISAAC's questionnaire. Regardless of the diagnosis of bronchial asthma of their children, all parents were asked to answer the questions relating to bronchial asthma with respect to the events in the past 12 months.

A) Q2-1 The question asked "Has a child experienced any wheezing or whistling in the chest?" in the last 12 months, and 6.6% answered "Yes."

It was the highest in the grades 1-2 at 10.2% and gradually tapered off to 8.1% in grades 3-4, 6.4% in grades 5-6, 4.9% in junior high school, and to 3.6% in senior high school. In terms of gender, it tended to be more common in boys and in girls until junior high school age. There was a decreasing trend compared to the last survey.

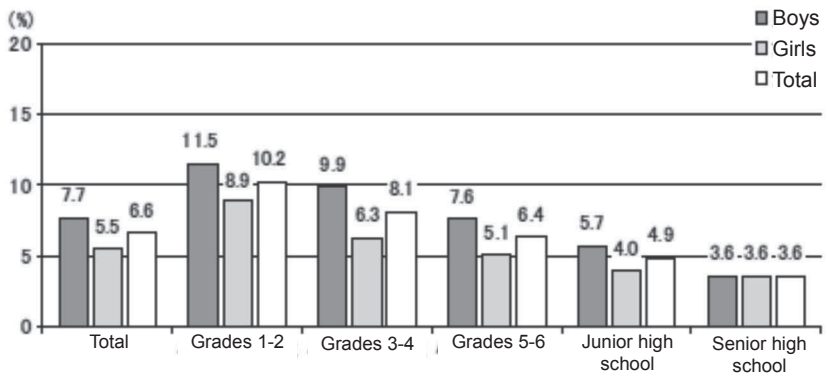


Figure 7-2-12 My child has experienced a wheezing or whistling in the chest.

B) Q2-2 For those who answered *yes* to the last question (Q2-1), the question asked "How often did the wheezing attacks happen?" in the last 12 months.

The answer "0 (zero)" occupied only 10.1%; 1-3 times was at 68.9%, 4-12 times was at 16.1%, and 13 times or more was at 3.1%. These figures have not changed from the last survey.

In terms of school age groups, 13 times or more was most commonly observed among junior high school students at 4.5%. It was 1.8% in grades 1-2, 3.8% in grades 3-4, 2.6% in grades 5-6, and 4.0% in senior high school. These figures were also similar to the last survey.

When the data are recalculated after combining the answers of 4-12 times and 13 times or more, the prevalence was low at 13.4% in grades 1-2; it remained between 20.4% and 24.0% for grades 3-4 and older with smaller differences between the school age groups, and a slightly increasing trend was also observed.

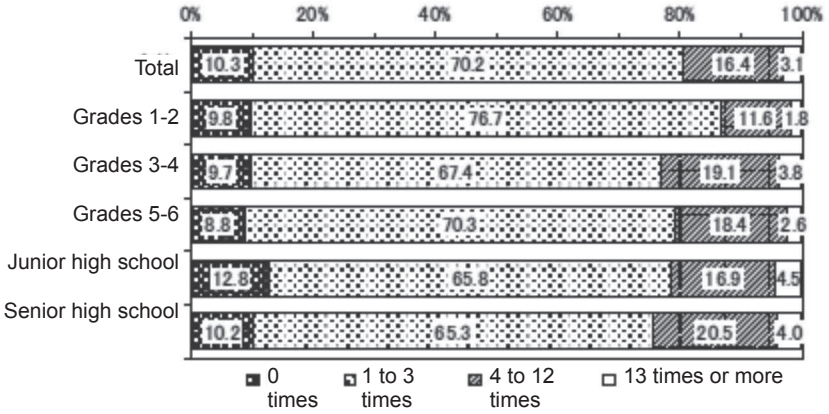


Figure 7-2-13 Number of times of the wheezing attacks in the children

C) Q2-3 For those who answered *yes* to wheezing in the previous question (Q2-1), the question asked "how often was a child's sleep disturbed by his/her wheezing?" in the last 12 months.

"Never" was the most common answer at 49.9%; however, it means that the other half experienced a sleep problem at nighttime.

"Once every few months" was 40.8%, "Once a month at night" was 2.7%, "Once a week at night" was 1.1%, and "More than once a week at night" was 2.9%.

Those who answered *once a week at night* or *more* reached as high as 4.0% when added together.

In terms of school age groups, the answers of *once a week at night* and *more* were most commonly observed in senior high school at 5.8%, followed by 3.1% in grades 1-2, 4.6% in grades 3-4, 4.2% in grades 5-6, and 3.7% in junior high school.

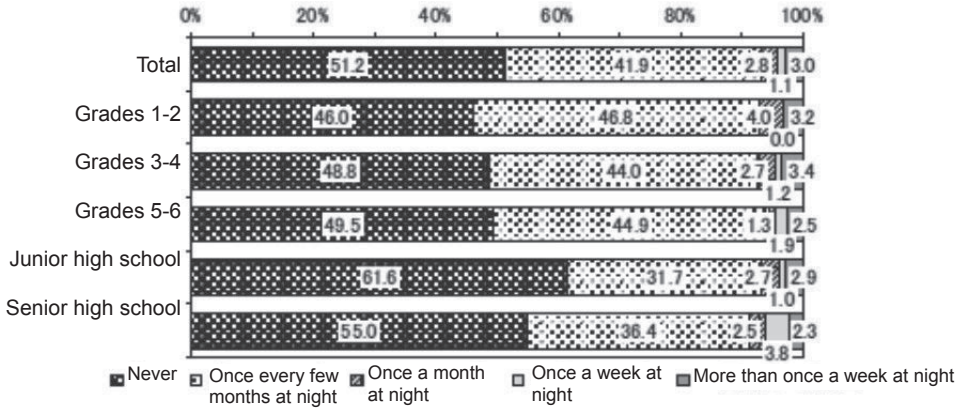


Figure 7-2-14 Frequency that a child's sleep was disrupted by his/her wheezing

D) Q2-4 For those who answered *yes* to wheezing in the previous question (Q2-1), the question asked "Was a child was ever wheezing in between each breath?" in the last 12 months.

"Yes" occupied 7.6%.

In terms of school age groups, it was the highest in senior high school at 12.8%, 6.3% in grades 1-2, 5.7% in grades 3-4, 9.1% in grades 5-6, and 8.2% in junior high school. No gender-specific tendency was observed.

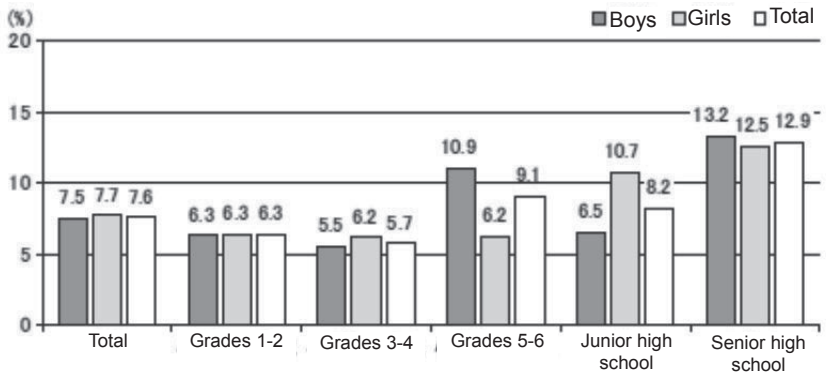


Figure 7-2-15 Whether or not a child was ever wheezing in between each breath

E) Summary

a) Discussion on severity

The majority answered that they have 1 to 3 attacks a year, which is classified as the intermittent type according to the guidelines. However, it is likely that a certain number of them are actually the mild-and-persistent type, considering that the parents tend to underestimate when assessing severity. Those with 4 to 12 attacks a year reached 15.8%. These children are classified as the intermittent type or mild-and-persistent type; however, it is likely that a certain number of them are actually the mild-and-persistent type or moderate-and-persistent type. Given the absence ratio observed in Q1-1, it is speculated that the disease control among children/students with bronchial asthma is poor. It should be noted that those with high frequency of attacks are junior and senior high school students; it is not difficult to speculate that they suffer from attacks at a certain level or more because their adherence declined after entering the adolescence.

In the survey items regarding severe attacks of bronchial asthma, 4.1% have experienced sleep impairment once a week or more, and 7.6% have experienced bad wheezing. This means that nearly 10% of children/students with bronchial asthma are moderate-and-persistent type or worse with poor disease management, the figure tends to increase during adolescence, and that the same situation is still in continuing.

	Elementary School Grades 1-2	Elementary School Grades 3-4	Elementary School Grades 5-6	Junior high school	Senior high school
Q1. A child has been diagnosed and is being treated or managed at present. ★	6.7%	5.6%	4.4%	3.4%	2.1%
Q2-1 Was a child ever wheezing or whistling in between each breath? (Yes) ★	10.2%	8.1%	6.4%	4.9%	3.6%
Q2-2 The number of times that a child experienced wheezing [13 times or more per year]*	1.8%	3.8%	2.6%	4.5%	4.0%
Q2-3 The number of times that a child's sleep was disrupted by his/her wheezing [Once or more at night in a week.]*	3.2%	3.4%	2.5%	2.9%	2.3%
Q2-4 Was a child ever wheezing badly in between each breath? (Yes]) *	6.3%	5.7%	9.1%	8.2%	12.9%
Q1-2 Steroid inhaler user ratio#	37.5%	45.8%	45.5%	43.7%	36.0%
Q1-2 Leukotriene receptor antagonist user ratio#	53.0%	59.4%	51.0%	37.1%	22.0%

★ For all parents.

* For the parents of the children who has experienced wheezing and whistling in Q2-1.

For the parents of the children who are currently diagnosed as having bronchial asthma by physicians and are under treatment/support.

When Q-1, the prevalence of bronchial asthma as being currently diagnosed by physicians, was compared to Q2-1, the prevalence of wheezing or whistling within the last 12 months, the prevalence of Q2-1 was generally higher than that of Q1, and the difference between the two was greater in younger age groups. The true bronchial asthma prevalence is likely close to that of Q2-1, which suggest that there is a certain number of children/students who have not been professionally diagnosed nor received any treatment whose conditions are poorly managed. Experiencing13 times or more wheezing attacks per year in Q2-2 indicates that attacks occur once a month or more, which corresponds to the mild-and-persistent type or worse in severity according to the guideline. Similarly, experiencing a sleep problem due to wheezing once or more in a week in Q2-3 indicates the moderate-and-persistent type or worse. To summarize, roughly 5% of children with bronchial asthma in each school age group are controlling their symptoms poorly, and school ages made no difference.

The prevalence of advanced bronchial asthma attacks suggested in Q2-4 is even higher, and the prevalence tended to rise in older age groups. This suggests that older school age groups have poorer disease control. In addition, the prescription rates of steroid inhalers and leukotriene receptor antagonists were generally lower than the usage ratios of these drugs at the specialized institutions; in particular, the prescription rates of both were further lower for high school students. This suggests that there is a potential problem in the disease control of those in puberty, especially senior high school students.

	Survey year	2013		2015	
	Grade	N	Prevalence	N	Prevalence
JSSH survey	Elementary School Grades 1-2	1,541	13.6%	2,200	10.2%
	Elementary School Grades 3-4	2,453	11.7%	2,701	8.1%
	Elementary School Grades 5-6	1,796	8.7%	2,598	6.4%
	Junior high school	3,845	5.7%	7,480	4.9%
	Senior high school	2,038	4.6%	4,298	3.6%

	Age	N	Prevalence	Survey year
Fukuoka	6-7 years old	2,901	17.3%	1994
	6-7 years old	2,958	18.2%	2003
	13-14 years old	2,831	13.4%	1994
	13-14 years old	2,520	13.0%	2003
Nation-wide	6-7 years old	47,050	13.9%	2005
	6-7 years old	43,813	13.5%	2008
	13-14 years old	51,597	8.8%	2005

b) Discussion on prevalence

When Q2-1 is compared to the last survey as the bronchial asthma prevalence, the prevalence has decreased in general. However, the difference is only 2% between this survey and the last, so it is still too premature to state that the bronchial asthma prevalence is on a decreasing trend. A determination should be made based on the results of a series of surveys in the future.

Additionally, the comparison of this survey with a large-scale epidemiological study in Japan shows that the results from this survey tended to be clearly lower in each age group, generally. It is unknown whether this was due to the bias in the study subjects of this survey or that the bronchial asthma prevalence among junior and senior high school students is actually decreasing; again, a determination should be made based on the results of a series of surveys in the future.

7) Q3 History of anaphylaxis and anaphylactic shock & Q4 epinephrine auto injector **carrier ratio**

A) History of anaphylaxis and anaphylactic shock

In terms of history of anaphylaxis and anaphylactic shock, it was 3.9% and 0.6% (64,353 persons, est.), respectively. No gender difference was observed, and no major variation was found across school age groups.

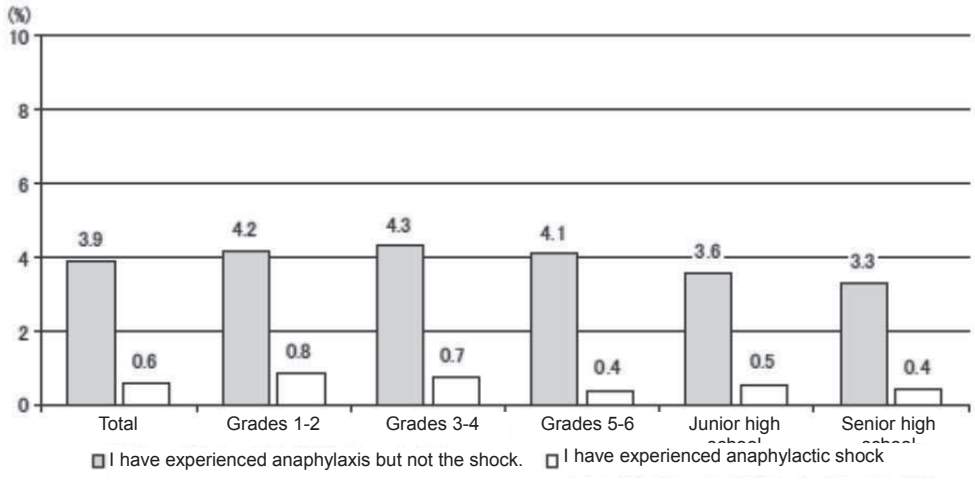


Figure 7-2-16 History of anaphylaxis and anaphylactic shock

B) The epinephrine auto injector carrier ratio

The epinephrine auto injector carriers accounted for 0.3% (32,854 persons, est.), of which 76.3% were under school support. Both the carrier and support ratios have increased compared to the last survey.

C) Summary

a) Frequency of anaphylaxis and anaphylactic shock

In this study, *anaphylaxis* was defined as "a state in which multiple symptoms on skin (urticaria, itching, etc.), membranes (swollen lips, eye lids, etc.), the respiratory system (coughing, wheezing, etc.), and/or the digestive system (vomiting, diarrhea, abdominal pain, etc.) appear systematically," and *anaphylactic shock* was defined as "a state in which more serious conditions of anaphylactic symptoms appear, such as being listless or semiconscious, having a pale face, or not responding to a call or stimulus."

In the exhaustive survey conducted by the Ministry of Education, Culture, Sports, Science and Technology of Japan in 2013, the prevalence of anaphylaxis among school children was 0.6%, but the questions did not clearly define anaphylaxis. In another exhaustive survey that targeted the grade 3 children (approx. 6,000 children) in Sagamihara City, Kanagawa Prefecture, which definition of anaphylaxis was similar to this survey, the prevalence of anaphylaxis was 1.2%, and that of anaphylactic shocks was 0.04%. Compared to these results, 3.9% for anaphylactic reasons and 0.6% for anaphylactic shocks observed in this survey are extremely high.

According to this survey, those who are currently diagnosed as having food allergy accounts for 2.5%, and the figure rises to 7.9% when those with past diagnosis are added. Those who were once diagnosed accounts for 3.9%; although the cause of anaphylaxis is not always food allergy, 3.9% is clearly high considering that most anaphylaxis in children is due to food allergy. In addition, anaphylactic shock is at 0.6%, which is 15 times higher than the Sagamihara study in which the term was clearly defined; this figure is obviously high. Nevertheless, it is likely that anaphylaxis and anaphylactic shock are in fact on the increasing trend, considering that the epinephrine auto injector carrier ratio was at 0.3% with an increasing trend. It is also possible that there has been a positive bias in the results after the fatal accident of a school meal service in 2012, which raised social awareness for anaphylaxis and prompted the parents of food allergy patients to actively file for support and encouraged the school to carefully interview the children. Continuous monitoring and future investigation will be vital to study the true prevalence of anaphylaxis, considering that the results from the last survey is similar to the ones from this survey. The next survey should also add more survey items to raise accuracy of questions.

B) Epinephrine auto injector carrier ratio

The injection of epinephrine auto injector by school teachers was permitted in 2008, and it became enlisted under the national healthcare insurance coverage; its prescription is rapidly increasing in the number after the fatal accident by food allergy due to a school meal that happened at the end of FY2008. The ratio of those who carry epinephrine, which accounted for 0.1% in the last survey, became tripled at 0.3% in this survey. The estimated number of children who carry epinephrine amounts to roughly 32,000, suggesting

that epinephrine response is becoming an essential school support at any school.

The epinephrine auto injector carrier ratio of 0.3% is still a low figure when placing the 0.6% prevalence of anaphylactic shocks at the baseline, and there is a chance that the number of prescription will continue to increase.

It should also be noted that the school support rate for epinephrine auto injector increased to 76.3% in this survey from 62.4% in the last survey. Although this trend of increase is delightful, it also means that one quarter of school children and students who carry epinephrine auto injector are still without school support, and it needs to be corrected.

3 Results including cross examination

In the analysis for this survey, cross-tabulation or logistic analysis were carried out on the following items.

1) Current medical history for allergic disease in relation to body styles

A) Analysis of 6 groups based on the overweight index

The prevalence of allergic disease was 14.0% for the highly obese group, 12.0% for the moderately obese group, 15.0% for the lightly obese group, 13.5% for the normal group, 14.7% for the thin group, and 42.4% for the highly thin group. The ratio of those who are highly thin and have a complication of allergic disease is high, probably because the number of relevant subjects are small to begin with. It is therefore believed that there is no difference among the 6 groups, and similarly, there is no difference among school age groups.

B) Analysis of 3 groups based on the BMI

The prevalence of allergic disease was 13.2% for the obese group, 13.5% for the normal body weight group, and 13.5% for the thin group, which again suggests no difference among the BMI groups. There was no difference among the school age groups.

C) Analysis of 3 groups based on the body style

The prevalence of allergic disease was 13.8% for the obese group, 13.4% for the normal group, and 15.6% for the thin group, which again suggests no difference among the body style groups. There was no difference among the school age groups.

D) Blood pressure (systolic and diastolic), total cholesterol, and LDL

For each items the subjects were divided to the normal, boundary, and abnormal range groups to examine the ratio of those who also have allergic diseases including bronchial asthma; however, no trend was clearly shown perhaps due to small sample size.

2) Logistic regression analysis on the presence of each disease and mental health (Q34-1 though -7, Q35-1 through -11)

A) Bronchial asthma

In Q35-2 “Sometimes I lose my temper over trivial things,” the odds ratio between “Applicable” and “Not applicable” was 0.638 (95% Confidence Interval [CI]: 0.420-0.971).

In Q35-4 “I have been bullied or teased by other children,” the odds ratio between “Very applicable” and “Not applicable” was 1.900 (95%CI: 1.117-3.233).

B) Atopic dermatitis

In Q34-2 “Sometimes I have trouble sleeping,” the odds ratio between “Rarely” and “I do not feel so” was 1.277 (95% CI: 1.039-1.569).

In Q35-4 “I have been bullied or teased by other children,” the odds ratio between “Applicable” and “Not applicable” was 1.812 (95%CI: 1.256-2.614).

In Q35-8 “I have few things I can boast,” the odds ratio between “Very applicable” and “Not applicable” was 1.550 (95% CI: 1.027-2.340).

In Q35-10 “I give up quickly when I think of doing something because I feel I won’t be able to do it,” the odds ratio between “Rarely applicable” and “Not applicable” was 1.320 (95% CI: 1.004-1.736).

In Q35-11 “I get tense and cannot relax all the time,” the odds ratio between “Applicable” and “Not applicable” was 0.731 (95% CI: 0.522-0.967). In the same question, the odds ratio between “Rarely applicable” and “Not applicable” was 0.754 (95%CI: 0.570-0.998).

C) Food allergy

In Q34-2 “I cannot stay still because I cannot be calm,” the odds ratio between “I often feel so” and “I feel so” was 1.953 (95% CI: 1.265-3.016).

In Question 35-1 “Sometimes I suddenly feel angry, starts crying, or feel happy,” the odds ratio between “Very applicable” and “Not applicable” was 1.762 (95%CI: 1.013-3.064).

In Q35.3 “I have gotten into a quarrel or fight or bullied other children,” the odds ratio between “Rarely applicable” and “Not applicable” was 0.703 (95%CI: 0.507-0.976).

In Q35-4 “I have been bullied or teased by other children,” the odds ratio between “Rarely applicable” and “Not applicable” was 1.511 (95%CI: 1.090-2.094).

In Q35-8 “I have few things I can boast,” the odds ratio between “Very applicable” and “Not applicable” was 0.605 (95% CI: 0.392-0.935).

D) Allergic rhinitis (including pollinosis)

In Q35-4 “I have been bullied or teased by other children,” the odds ratio between “Very applicable” and “Not applicable” was 1.298 (95%CI: 1.007-1.674).

In Q35-10 “I give up quickly when I think of doing something because I feel I won’t be able to do it,” the odds ratio between “Very applicable” and “Not applicable” and between “Applicable” and “Not applicable” was 0.811 (95% CI: 0.687-0.957) and 0.760 (95% CI: 0.625-0.925), respectively.

E) Allergic conjunctivitis (including pollinosis)

In Q34-2 “Sometimes I have trouble sleeping,” the odds ratio between “I occasionally feel so” and “I do not feel so” was 1.470 (95% CI: 1.173-1.842).

In Q35-4 “I have been bullied or teased by other children,” the odds ratio between “Very applicable” and “Not applicable” was 1.721 (95%CI: 1.046-2.833).

In Q35.9 “Sometimes I feel I am good for nothing,” the odds ratio between “Rarely applicable” and “Not applicable” was 0.705 (95%CI: 0.510-0.975).

F) Cedar pollen allergy

In Question 35-1 “Sometimes I suddenly feel angry, starts crying, or feel happy,” the odds ratio between “Very applicable” and “Not applicable” was 1.307 (95%CI: 1.039-1.644).

In Q35-2 “Sometimes I lose my temper over trivial things,” the odds ratio between “Rarely applicable” and “Not applicable” was 0.847 (95% Confidence Interval [CI]: 0.719-0.999).

In Q35-8 “I have few things I can boast,” the odds ratio between “Rarely applicable” and “Not applicable” was 1.246 (95% CI: 1.026-1.513).

In Q35-10 “I give up quickly when I think of doing something because I feel I won’t be able to do it,” the odds ratio between “Applicable” and “Not applicable” and between “Rarely applicable” and “Not applicable” was 0.742 (95% CI: 0.572-0.963) and 0.819 (95% CI: 0.675-0.994), respectively.

G) Sick building syndrome

In Q34-1 “Sometimes I feel like I don’t want to do anything because I feel depressed,” the odds ratio between “I occasionally feel so” and “I do not feel so” was 1.968 (95% CI: 1.003-3.864).

In Q35-4 “I have been bullied or teased by other children,” the odds ratio between “Very applicable” and “Not applicable” and between “Applicable” and “Not applicable” was 3.722 (95%CI: 1.371-10.380) and 4.516 (95%CI: 2.204-9.255), respectively.

H) Summary

In Q35-4 “I have been bullied or teased by other children,” the odds ratio between “Very applicable” and “Not applicable” was 3.722 for sick building syndrome, 1.900 for bronchial asthma, 1.298 for allergic rhinitis, and 1.721 for allergic conjunctivitis; the odds ratio between “Applicable” and “Not applicable” was 4.516 for sick building syndrome, 1.812 for atopic dermatitis; and the odds ratio between “Rarely applicable” and “Not applicable” was 1.511 for food allergy. In any disease, school children and students who are bullied or teased tended to have allergic decrease more commonly. Although it is not clear if having allergic disease causes to be bullied or teased, this consistent trend across different allergic diseases is alarming, and it should be watched carefully.

Other negative factors in each disease included having difficulty falling asleep, not having something to boast, and do not feel like something can be done for atopic dermatitis; not being able to calm and not being able to control emotions for food allergy; having difficulty falling asleep for allergic conjunctivitis; not being able to control emotions and not having a confidence for pollinosis; and feeling depressed for sick building syndrome. On the other hand, bronchial asthma children had the odds ratio of 0.638 for “I lose my temper over trivial things” and also 0.754 for “I get tense and cannot relax,” so it is difficult to draw general conclusion. Repeated investigations will hopefully reveal the trend in future.

3) ISAAC questions, exercise, and mental health

Analysis was performed using the answers in ISAAC questions of *1-3 times a year or more* of wheezing and *once every few months at night or more* of sleep problem, all factors concerning time (hours of

sleep, weekly exercise time, time spent for high/moderate/light-intensity exercise, time spent at tutoring school in a week, time spent for lessons excluding sports, etc.) and the answers in mental health as the dependent variables.

A) *1 to 3 times a year or more* of wheezing

Our analysis failed to produce statistically significant results for any time-related factors.

In Q35-4 "I have been bullied or teased by other children," the odds ratio between "Applicable" and "Not applicable" was 0.290 (95%CI: 0.114-0.733).

In Q35-8 "I have few things I can boast," the odds ratio between "Rarely applicable" and "Not applicable" was 0.379 (95% CI: 0.146-0.987).

B) *Once every few months at night or more* of sleep problem

Our analysis failed to produce statistically significant results for any time-related factors.

In Q34-2 "Sometimes I have trouble sleeping," the odds ratio between "I often feel so" and "I do not feel so" was 2.622 (95% CI: 1.291-5.324).

In Q34-2 "I cannot stay still because I cannot be calm," the odds ratio between "I often feel so" and "I feel so" was 0.273 (95% CI: 0.109-0.687).

In Q34-5 "Sometimes I do not have an appetite," the odds ratio between "I rarely feel so" and "I do not feel so" was 2.448 (95% CI: 1.490-4.024).

In Q35-11 "I get tense and cannot relax all the time," the odds ratio between "Applicable" and "Not applicable" was 2.209 (95% CI: 1.104-4.418).

C) Summary

Contrary to our expectations, neither wheezing nor sleep problem showed no causality with time-related factors.

For wheezing, the odds ratio for being bullied or teased by other children was 0.290, which is opposite of the odds ratio of 1.900 for bronchial asthma. We hope to clarify such conflicting results in future investigations. For sleep problem, there was a series of consistent trends, such as not having an appetite and not being able to relax.

4 Summary

The survey items for allergy symptoms have been changed significantly compared to the last survey in FY2002. Therefore, an evaluation of changes over time is not possible yet. However, comparison between this survey and the last one showed no major change in the prevalences of common diseases including various allergic diseases.

The results of the survey this time has again confirmed that the prevalence of allergic disease is high among the Japanese school children and students, and that the support for allergic disease in school is an urgent issue. For example, the school support for food allergy is extremely high at 100% or more, which reflects the importance in school. The school support ratios for other allergic diseases in this survey are generally higher than those of the last survey, indicating that the School Life Management Instruction Table is well spread.

The situation of bronchial asthma children having problems in school life showed some improvement compared to the last survey; however, it is an issue that should be continuously watched for. This indicates that the control level of bronchial asthma is insufficient, and more importantly, that many are undertreated by drugs. This survey successfully proved it based on the actual contents of professional treatment provided. It is illustrated by the low user ratio of steroid inhalers and leukotriene receptor antagonists and the high user ratio of bronchodilators.

The results of the ISAAC survey revealed that bronchial asthma treatment continues to be insufficient. Those with 4-12 times of attacks per year accounted for 15.8%, those with sleep problem of one night or more per week was 4.1%, and severe wheezing was observed in 7.6%. When the school absence ratio in Q1-1 is also considered, these figures are the reminders of the facts that bronchial asthma children and students have poor disease control and that a certain number of severely ill patients still exists among them.

As for food allergy, peanut, chicken egg, shell fish, milk, fruits, fish egg, and nuts are removed from the diet based on physicians' diagnosis, whereas chicken egg, fruits, shell fish, buckwheats are often removed from the diet based on parental discretion. The School Life Management Instruction Table is spreading in school and the number of cases of parents removing certain food items based on their discretion is decreasing; however, the proportion of parental discretion was still very high. In addition, those who submit professional instructions such as the School Life Management Instruction Table or medical certificate was still only 38.1%, suggesting that it is yet to gain more acceptance. It will be important to continue this

investigation to evaluate if schools are providing proper support for food allergy.

The epinephrine auto injector carrier ratio was 0.3%, which has tripled compared to the last survey. The estimated number of the carriers amounts to roughly 32,000, suggesting that epinephrine response is becoming an essential school support at any school. The epinephrine auto injector carrier ratio of 0.3% is still a low figure when placing the 0.6% prevalence of anaphylactic shocks at the baseline, and there is a chance that the number of prescription will continue to increase.

It should also be noted that the school support rate for epinephrine auto injector increased to 76.3% in this survey from 62.4% in the last survey. One quarter of school children and students who carry epinephrine auto injector are not receiving school support, which needs to be corrected promptly.

The analysis of question items on mental health in relation to allergic diseases revealed that "school children and students who are bullied or teased" tend have high prevalence across all allergic diseases.

Although it is not clear if they are bullied or teased because they have allergic disease, this consistent trend across all allergic diseases must not be overlooked. Repeated investigations will hopefully reveal the trend in future.

This surveillance is limited in the way that the study subjects are not sampled randomly. It is uncertain whether the sampled population would truly allow to speculate the general population of Japanese school children and students or not. From the point of making comparisons over time, it would be desirable to carefully select the sample population and to establish fixed sampling points of this surveillance project in future. It will be desirable to conduct the survey regularly on the continuous basis, considering it can aid in policy development for school support and serve as the indicator for true status of allergic disease among the Japanese school children and students. This surveillance project will continue to bring light to the prevalence of allergy diseases based on proper diagnosis, the status of support and the reality in school life, the management status of bronchial asthma, and the reality of anaphylaxis among school children and students.

Methods of data aggregation in this survey

1 Data weighting

Table 1 shows the number of sample size of this survey. The ratios among different school types, school ages, and gender are highly biased in some cases compared to the ratios of the general population. Using raw data without any adjustment can lead to distorted results because the result will be significantly affected by the school ages and gender with more samples. Therefore, the data were weighted to adjust for the bias in school ages and gender.

Table 1 Weight calculation

	Gender	Sample		General population		Weight
		n	%	*N*	%	
Grade 1	Boys	550	2.9%	550,239	4.6%	1,000.43
	Girls	545	2.8%	521,221	4.4%	956.37
Grade 2	Boys	571	3.0%	547,617	4.6%	959.05
	Girls	535	2.8%	521,176	4.4%	974.16
Grade 3	Boys	530	2.8%	534,426	4.5%	1,008.35
	Girls	549	2.9%	507,408	4.3%	924.24
Grade 4	Boys	847	4.4%	551,709	4.6%	651.37
	Girls	781	4.1%	525,087	4.4%	672.33
Grade 5	Boys	692	3.6%	564,619	4.7%	815.92
	Girls	655	3.4%	536,420	4.5%	818.96
Grade 6	Boys	627	3.3%	575,453	4.8%	917.79
	Girls	627	3.3%	546,021	4.6%	870.85
Grade 7 (Junior high school: Freshman)	Boys	1,422	7.4%	549,536	4.6%	386.45
	Girls	1,327	6.9%	518,973	4.4%	391.09
Grade 8 (Junior high school: Junior)	Boys	1,362	7.1%	554,203	4.7%	406.90
	Girls	1,298	6.8%	522,030	4.4%	402.18
Grade 9 (Junior high school: Senior)	Boys	1,060	5.5%	557,006	4.7%	525.48
	Girls	1,017	5.3%	525,566	4.4%	516.78
Grade 10 (Senior high school: Freshman)	Boys	949	4.9%	371,897	3.1%	391.88
	Girls	1,088	5.7%	373,604	3.1%	343.39
Grade 11 (Senior high school: Junior)	Boys	722	3.8%	358,414	3.0%	496.42
	Girls	754	3.9%	365,054	3.1%	484.16
Grade 12 (Senior high school: Senior)	Boys	327	1.7%	354,615	3.0%	1,084.45
	Girls	378	2.0%	360,717	3.0%	954.28
Total		19,213	100.0%	11,893,011	100.0%	

Specifically, the weight w_i for the grade i is first obtained by dividing the sample size by the general population size of a given school age and gender.

Weight w_i = General population (N) / Sample (n) (1)

Then, an average of each item and a proportion of each option are obtained from the following equation.

$$\hat{\mu} = \sum_{i=1}^{n} w_i y_i \Big/ \sum_{i=1}^{n} w_i \quad (2)$$

It should be noted that y_i is the value of school children and students at the i-th grade when calculating an average of an item, but it is a 0/1 variable that takes 1 when the option in question is relevant for the school children and students at the i-th grade and 0 if not.

$$y_i = \begin{cases} 1, \text{ if the option in question is relevant} \\ 0, \text{ otherwise} \end{cases} \quad (3)$$

2 Cautions when examining the tabulated data

This survey uses weighted data. Therefore, the numbers of subjects used in data tabulation are listed, but the numbers of subjects by answer option are not shown. In addition, this Health Status Surveillance of School Children and Students is a bi-annual survey with an intention to understand the changes over time. The adjustment made in this survey were never performed for the surveys conduced in FY2010 or earlier, so it requires caution when comparing the results of this survey to those of FY2010 or earlier.

It should also be noted that the subjects of this survey were selected through schools, i.e., no school children/students in this survey were not directly selected as the subjects. In consideration of this fact, a standard error (SE) ($\hat{\mu}$) was obtained using the following equation when evaluating a hypothesis.

$$SE(\hat{\mu}) = \frac{1}{\sum_{i=1}^{n} w_i} \sqrt{\frac{m}{m-1} \sum_{a=1}^{m} \left(\sum_{i \in S_2} w_i y_i - \hat{\mu} \sum_{i \in S_2} w_i \right)^2} \qquad (4)$$

Note that s_a represents the school children/students at the school a, and that the total number of schools surveyed was m.

CONCLUSION

This surveillance project originally started in 1981, and it was then intended as an allergy survey of school children and students and an epidemiological study on childhood lifestyle-related diseases that were referred to as the childhood adult diseases in those days. The prerequisite for selecting target schools for various investigations was that tests for risk factors of childhood lifestyle-related diseases -- for example, serum lipid test and blood pressure measurement, to name a few -- were carried out at school. The survey became bi-annual from 1992, but the scope and contents for health information survey, which was originally a secondary investigation, became more in-depth as years passed. Originally, the purpose of studying everyday life status and health information of school children and students was to bring light on the problems of childhood lifestyle-related disease by cross-referencing these health information with risk factors.

At present, the direction of the objectives has slightly changed from the original starting point; risk factors have become a secondary investigation whereas everyday life status and health information have gain weight with identify, and this directionality will likely increase the significance of this surveillance project as it continues in the future.

Considering the above, various attempts of reforms have been made since the FY2012 survey to ensure that the survey results will represent the reality of the current school children and students from statistical and epidemiological points of view.

Having being fully aware of the above, an educational book intended for the general public -- mainly the school officials and parents of school children and students -- is expected to be published this year in addition to conducting the surveillance in order to gather health problems of the current children based on this surveillance and to bring a step closer in a better direction toward resolution. At the same time, the outcome produced from this surveillance project over the years will be published in English as well.

I hope that all parties involved will continue to look forward to this surveillance project and sincerely ask for your understanding and cooperation.

Mitsunori MURATA

Survey Sheets for *Health Status Surveillance of School Children and Students*

<< Request for Entry >>

With the recent changes in social environment and lifestyle, some school children and students are exhibiting signs of lifestyle-related disease, and a concern for various allergic diseases is rising as a health problem.

Japan society of School Health (JSSH) is collecting and analyzing information on health status of school children and students on a continuous basis to contribute to the examination of accurate measures based the reality regarding new health problems.

This survey is limited to statistical processing for tabulation with due consideration for personal information and privacy protection, and it will not cause any inconvenience for school children and students or their parents.

We sincerely ask for your understanding for the purpose of the survey and cooperation in filling out the forms.

If you are willing to cooperate in our survey, please complete the forms in accordance with the "Instructions on filling out the survey" described below.

<< Content of the survey >>

1. Questionnaire on *life style*
2. Questionnaire on *allergy symptoms*
3. Investigation of *risk factors for lifestyle-related disease*

<< Instructions on filling out the survey >>

1. Notes on answering the survey

(1) Questionnaire on *life style*

Elementary school children: Children bring the questionnaire form to their home, and the parent will complete the form.

Junior and senior high school students: Students complete the form by themselves.

(2) Questionnaire on *allergy symptoms*

Elementary school children and junior and senior high school students bring home the questionnaire, and the parent will complete the form.

(3) Investigation on *risk factors for lifestyle-related disease*

A school teacher or Nursing Teacher (YOGO Teacher) will collect the questionnaires from the children/students who finished (1) and (2) and fill out the forms.

2. Notes when filling out the questionnaires

(1) For a question that asks for a specific time of duration or number of times, please use the boxes provided at the right side of the question statement using Arabic numerals. Please enter the approximate values when it is difficult to enter precise values.

(Example) Q. What time did you go to bed last night?

☐☐ : ☐☐ (hh:mm)

* Please enter the time based on the 24-hour clock.

In the question above, you will enter "22:00" if you went to bed at 10 pm, following the instruction to enter the value based on the 24-hour clock.

(2) For a question that has only 1 box ☐ to enter your answer at the right side of the question statement, please select only 1 answer from the available options and enter the numerical value of the chosen answer in the box.

(Example) Q. How did you feel when you woke up this morning?

1. I woke up refreshed.
2. I was still sleepy a little.
3. I was sleepy and had trouble waking up.

1

If the answer you choose was "I woke up refreshed," please enter "1" in the answer box here.

(3) For a question that asks to circle all answers that apply to you, please select all applicable answers by entering a circle in the answer box ☐ at the left side of each answer option.

(Example) Please answer this question only if you selected "1: I feel so" as your answer. What are the reasons that you feel a lack of sleep? Please circle all that apply. (As many as they apply.)

The reasons for answering "1: I feel so."

○	1. Somehow I stay up late.
	2. I stay up late doing assignments and homework.
	3. My bedtime becomes later because everyone in my family goes to sleep late at night.
	4. I am watching a television, DVD, or video on the Internet
	5. I am playing games.
○	6. I am engaged in social exchanges with someone using my mobile phones, smartphones, e-mails, etc.
	7. I am surfing on the Internet looking at various web sites.
	8.I have trouble falling asleep.
	9. I stay up late because I come home late.
	10. Others

If "1: Somehow I stay up late" and "6: I am engaged in social exchanges with someone using my mobile phones, smartphones, e-mails, etc." apply in the question above, you will enter a circle in the answer box next to each of the answer options 1 and 6.

(4) If a question statement asks to answer a degree that applies for each item, please enter numerical values in the answer box to indicate the degree that applies to you.

(Example) Q. How do you normally feel about the following? Please enter the level that apply using the corresponding numerical value for each question.

1. I often feel so (about once a week)	.....	1
2. I occasionally feel so (about once a month).	.....	2
3. I rarely feel so (less than once a month).	.....	3
4. I do not feel so	.....	4

Example of a question	Answer box
1. Sometimes I feel like I don't want to do anything because I feel depressed	1
2. Sometimes I have trouble sleeping	2

If your answer is "I often feel so (about once a week)," then, you will enter "1" in the answer box of the question as instructed.

(5) The asterisk "*" indicates a question that that require additional information to understand, so please read the supplementary information carefully before answering.

3. Other things to note

(1) The survey consists of a set of 3 questionnaire forms; please be sure never to cut apart any sheet from the questionnaires.
If any sheet comes apart, you must use a staple or tape to attach it back.
(2) No sheets must be detached when submitting the questionnaires.
(3) Please ensure to reflect your situations on weekdays in your answers, not the situations on Saturdays, Sundays, or holidays.

1. Questionnaire on *life style*

For elementary school children, we sincerely ask the parent to complete the form.

Q1. What time did you go to bed last night?

☐☐ : ☐☐ (hh:mm)

* Please enter the time based on the 24-hour clock.
* Please be sure to enter 2 digits for both the hour and the minute. For example, please enter "22:00" if you went to sleep at 10 p.m.
* If your sleep was divided into two, please enter the longer one.

Q2. Were you able to fall asleep quickly?

1. I fell asleep quickly. 2. I had trouble falling asleep. 3. I do not remember well.

☐

Q3. What time did you wake up this morning?

☐☐ : ☐☐ (hh:mm)

* Please be sure to enter 2 digits for both the hour and the minute. For example, please enter "06:00" if you woke up at 6 a.m.
* If your sleep was divided into two, please enter the time for the longer one as you did in Q1.

Q4. How did you feel when you woke up this morning?

1. I woke up refreshed. 2. I was still sleepy a little. 3. I was sleepy and had trouble waking up.

☐

Q5. Do you feel a lack of sleep, lately?

1. I feel so. 2. I do not feel so.

☐

5-1. Please answer the this question only if you selected "1: I feel so" as your answer. What are the reasons that you feel a lack of sleep? Please circle all that apply. (As many as they apply.)

The reasons for answering "1: I feel so."

- ☐ 1. Somehow I stay up late.
- ☐ 2. I stay up late doing assignments and homework.
- ☐ 3. My bedtime becomes later because everyone in my family goes to sleep late at night.
- ☐ 4. I am watching a television, DVD, or video on the Internet
- ☐ 5. I am playing games.
- ☐ 6. I am engaged in social exchanges with someone using my mobile phones, smartphones, e-mails, etc.
- ☐ 7. I am surfing on the Internet looking at various web sites.
- ☐ 8.I have trouble falling asleep.
- ☐ 9. I stay up late because I come home late.
- ☐ 10. Others

If "1: Somehow I stay up late" and "6: I am engaged in social exchanges with someone using my mobile phones, smartphones, e-mails, etc." apply in the question above, you will enter a circle in the answer box next to each of the answer options 1 and 6.

Q6. What time do you usually leave home to go to school?

☐☐ : ☐☐ (hh:mm)

* Please be sure to enter 2 digits for both the hour and the minute. For example, please enter "07:15" if it is 7; 15 a.m...

Q7. How is your daily bowel movement pattern?

1. I have a daily bowel movement about the same time a day.
2. I have a daily bowel movement but not always at the same time of a day.
3. I occasionally do not have a bowel movement.
4. Sometimes I do not have a bowel movement for a few days.

☐

* Please answer based on the last one week in general.

Q8. Do you eat in the morning?

1. I eat every day.
2. I eat more often than I do not.
3. I skip more often than I do not.
4. I hardly eat.
5. I skip every day.

☐

8-1. Please answer this question only <u>if you selected "3: I skip more often than I do not,""4: I hardly eat," or '5: I skip every day"</u> as your answer in Q8.
What is the reason for not to eating in the morning?

1. I don't have the time to eat.
2. I don't have an appetite.
3. I don't want to get fat.
4. A meal is not prepared.
5. Others

☐

Q9. Do you often eat breakfast alone, not with any other family members?

1. Very often
2. Sometimes
3. Occasionally
4. Hardly ever

☐

Q10. Do you often eat dinner alone, not with any other family members?

1. Very often
2. Sometimes
3. Occasionally
4. Hardly ever

☐

Q11. Do you eat again after dinner?

1. Very often
2. Sometimes
3. Occasionally
4. Hardly ever

☐

11-1. Please answer this question <u>only if you selected "1: Very often," "2: Sometimes," or "3: Occasionally"</u> as your answer in Q11.
What time are you eating again?

* Please enter the time based on the 24-hour clock.
* Please be sure to enter 2 digits for both the hour and the minute. (Example: 21:30, roughly)

☐☐ : ☐☐ (hh:mm)

Q12. Do you leave some food on the dishes?

1. Very often
2. Sometimes
3. Sometimes
4. Hardly ever

☐

Q13. What are your reasons when you leave some food on the dishes?

1. I don't have the time to eat.
2. I don't have an appetite.
3. I don't want to get fat.
4. The food I dislike is on the plates
5. There are too much food.
6. Others

☐

Q14. Do you ever continue eating snacks?

1. Very often
2. Sometimes
3. Occasionally
4. Hardly ever

☐

Q15. What do you have for a breakfast or dinner when eating at home? Dishes that are on the table but you leave out or don't eat should be excluded.

* The staple food (e.g., rice, bread, cereal, noodles, etc.), main dish (e.g., a dish with fish, meat, eggs, bean products, and/or dairy products), and side dish (e.g., *miso* soup or soup with vegetables, potatoes, seaweed, kelps, and mushrooms).
* Fruits, drinks such as milk or juice, and snacks are not considered a part of the staple, main, or side dishes.

15-1. What do you normally have for a breakfast?

1. Only the staple food
2. Only a main dish
3. Only side dishes
4. The staple food and a main dish
5. Staple food and side dishes
6. Staple food, a main dish, and side dishes.
7. Others (fruits only, drinks only, or snacks only)

☐

15-2. What do you normally are for a dinner?

1. Only the staple food
2. Only the main dish
3. Only the side dishes
4. The staple food and the main dish
5. Staple food and side dishes
6. Staple food, a main dish, and side dishes.
7. Others (fruits only, drinks only, or snacks only)

☐

Q16. How do you feel about your body shape?

1. I want to lose a lot of weight.
2. I want to lose a little more weight.

3. I feel I am good as is. 4. I want to gain a little more weight.
5. I want to gain a lot of weight.

☐

Q17. Have you ever been on a diet before?
1. I have been on a diet under doctor's supervision.
2. I have been on a diet under school teacher's supervision.
3. I have been on a diet following my own plans.
4. I never have.

☐

Q18. How many hours do you usually spend reading books, newspapers, magazines, or *anime* comics outside of school?

About ☐☐ : ☐☐ (hh:mm)

Q19. How many hours do you usually spend listening to music or radio outside of school?

About ☐☐ : ☐☐ (hh:mm)

Q20. How many hours do you usually spend playing games other than online games outside of school?

About ☐☐ : ☐☐ (hh:mm)

Q21. How many hours do you usually spend watching a television, video, or DVD (excluding video on the Internet) outside of school?

About ☐☐ : ☐☐ (hh:mm)

Q22. How many hours do you usually spend using a mobile phone, smartphone, tablet, and personal computer outside of school?

A mobile phone and smartphone

About ☐☐ : ☐☐ (hh:mm)

A tablet and personal computer

About ☐☐ : ☐☐ (hh:mm)

22-1. Of those hours, how long do you spend doing the following activities?

Watching videos

About ☐☐ : ☐☐ (hh:mm)

Playing online games

About ☐☐ : ☐☐ (hh:mm)

Reading news, blogs, e-books, and *anime* comics

About ☐☐ : ☐☐ (hh:mm)

Reading/writing the SNS* and communicating with someone via e-mails

About ☐☐ : ☐☐ (hh:mm)

Making calls using a mobile phone or smartphone (including calls via Skype, FaceTime, or LINE)

About ☐☐ : ☐☐ (hh:mm)

* The Social Networking Service (SNS) is a type of Internet service to support inter-personal bonding for those who share a similar hobby or purpose; some well-known examples include LINE, Twitter, Facebook, Mixi, Mobage, and GREE.

Q23. Have you ever used the Internet service called the SNS?
1. I have used it 2. I want to start using it
3. I have never used it. 4. I do not know about it

☐

23-1. Please answer this question if only you selected "1: I have used it" as your answer in the previous question. Please circle all that apply. (As many as they apply.)

☐ 1. I have posted my opinions or things about my daily life
☐ 2. I have played online games

☐ 3. I have paid for these services.
☐ 4. I have posted pictures and videos.
☐ 5. I have been in contact with the person I met over the Internet.
☐ 6. I have actually met the person I met over the Internet.

23-2. Is anyone in your family aware that you are involved in the activities you stated in 23-1?
1. Yes 2. No

☐

Q24. Have you ever gotten caught in an Internet trouble before?
1. Yes 2. No

☐

24-1. Please answer the this question only if you selected "1: Yes" as your answer. Please circle all that apply. (As many as they apply.)
☐ 1. Personal information and/or pictures have been leaked.
☐ 2. Someone posted slanders or distasteful remarks on a bulletin board or SNS
☐ 3. I have been a victim of fictitious billing and/or one-click fraud.
☐ 4. I received chain mail (including letters of misfortune).
☐ 5. Others

Q25. How many hours do you usually spend studying other than school classes?
About ☐☐ : ☐☐ (hh:mm)

* It includes the time with your tutor(s) and surfing on the Internet to aid your study.

Q26. Do you go to a tutoring school (or use tutoring service)?
1. I do. 2. I do not.

☐

26-1. Please answer the this question only if you selected "1: I do" as your answer. How many times a week do you go?
☐ times a week

26-2. Please answer the this question only if you selected "1: I go to a tutoring school (or use tutoring service)" as your answer. How many hours do you spend in total?
Total (per week) ☐☐ : ☐☐ (hh:mm)

* Please exclude the time spent with your tutor(s) or lessons.

Q27. Do you take lessons (excluding sports)?
1. I do. 2. I do not.

☐

27-1.Please answer this question only if you selected "1: I do" as your answer. How many times a week do you go?
☐ times per week

27-2.Please answer this question only if you selected "1: I do" as your answer. How many hours do you spend in total?
Total (per week) ☐☐ : ☐☐ (hh:mm)

Q28. Are you regularly involved in a physically-active play at sports clubs or during extracurricular activities and other free time?

1. I do. 2. I do not.

☐

28-1. Are you a member of a school sports club?
1. I am. 2. I am not.

☐

28-2. Are you a member of a local sports club?
1. I am. 2. I am not.

☐

28-3.Are you involved in a physically-active play outside your extracurricular activities or a sports club?
1. Almost every day 2. I do more often than I do not.
3. I skip more often than I do not skip. 4. Hardly ever

☐

Q29. Do you exercise with your family?
1. Very often (once a week or more) 2. Occasionally (once a month or more)
3. Rarely (a few times a year) 4. Hardly ever (once a year or less)

☐

Q30. How long does it take to commute to school from home (one-way)?
The commuting time is about ☐☐ : ☐☐ (hh:mm)

Q31. How many hours in total do you usually spend in the following levels of exercise during your extracurricular activities and other free time? (excluding the time for physical education classes)
About ☐☐ : ☐☐ (hh:mm)

31-1. High-intensity exercise (that you breathe so rapidly you feel out of breath) (e.g., timed competition in running or swimming, ball games, etc.)
About ☐☐ : ☐☐ (hh:mm)

31-2.Moderate-intensity exercise (that you breathe faster but not to the point that you feel out of breath) (e.g., jogging, activity that involves footwork but you can enjoy conversation, etc.)
About ☐☐ : ☐☐ (hh:mm)

31-3.Light-intensity exercise (that you can almost maintain your regular breathing) (e.g., walking, warm-up, slow exercise with no running, etc.)
About ☐☐ : ☐☐ (hh:mm)

Q34. How do you normally feel about the following? Please enter the level that apply using the corresponding numerical value for each question.

1. I often feel so (about once a week)	.....	1
2. I occasionally feel so (about once a month).	.....	2
3. I rarely feel so (less than once a month).	.....	3
4. I do not feel so	.....	4

Questions	Answer box
1. Sometimes I feel like I don't want to do anything because I feel depressed	☐
2. Sometimes I have trouble sleeping	☐
3. I cannot stay still because I cannot be calm	☐
4. Sometimes I have trouble focusing or thinking fast	☐
5. Sometimes I do not have an appetite	☐
6. Sometimes I feel dull or easily tired	☐
7. Sometimes I think I want to die.*	☐

* Only junior and senior high school students answered the item 7.

Q35. How do you normally feel about the following? Please enter the level that apply using the corresponding numerical value for each question.

1. Very applicable	.....	1
2. Applicable	.....	2
3. Rarely applicable	.....	3
4. Not applicable	.....	4

Questions	Answer box
1. Sometimes I suddenly feel angry, starts crying, or feel happy.	☐
2. Sometimes I lose my temper over trivial things.	☐
3. Sometimes I have gotten into a quarrel or fight with other children.	☐
4. I have been bullied or teased by other children.	☐
5. I prefer to be alone and often spend time playing alone.	☐
6. I often pay attention to other people's feelings.	☐
7. I tend to willingly help my friend who is feeling depressed due to a problem or feeling obnoxious.	☐
8. I have few things I can boast.	☐
9. Sometimes I feel I am good for nothing.	☐
10. I give up quickly when I think of doing something because I feel I won't be able to do it.	☐
11. I get tense and cannot relax all the time.	☐

Thank you for your cooperation.

For the Parents

2. Questionnaire on *allergy symptoms*

For the following questions concerning your child's allergy, we ask the parent to fill in the answers.

Q1.<u>All parents are requested to answer this question.</u>

Was your child diagnosed with any of the following allergic diseases <u>in the past or at present</u>? Is your child <u>currently</u> receiving school support for any of them? Please circle all that apply. (As many as they apply.)

	The child is currently diagnosed as so and undergoing treatment and school support.	The child was diagnosed as so in the past but has been cured now.	The child is currently receiving school support.
1. Bronchial asthma	☐	☐	☐
2. Atopic dermatitis	☐	☐	☐
3. Food allergy	☐	☐	☐
4. Allergic rhinitis (including pollinosis)	☐	☐	☐
5. Allergic conjunctivitis (including pollinosis)	☐	☐	☐
6. Cedar pollen allergy	☐	☐	☐
7. Sick Building syndrome	☐	☐	☐
8. Bee (venom) allergy	☐	☐	☐
9. Others ( )	☐	☐	☐

1-1. Please answer this question only if the parent selected "1: The child is currently diagnosed as bronchial asthma and undergoing treatment and school support" as the answer in Q1.(Multiple answers)

Has there has been disruptions in school life in the last 12 months due to the bronchial asthma attacks?

- ☐ 1. The child was absent from a day.
- ☐ 2. The child was late for a class or left a school early for the day.
- ☐ 3. The child had to observe a class such as physical education.
- ☐ 4. The child could not join a school's day trip (field trip, hiking, hands-on learning, etc.).
- ☐ 5. The child could not join a field trip or school trip that required overnight stay.

1-2. Please answer this question only if the parent selected "1: The child is currently diagnosed as bronchial asthma and undergoing treatment and school support" as the answer in Q1.

Which ones of the following drugs does the child routinely use for the treatment of bronchial asthma at present? Please check all that apply (Multiple answers)

- ☐ 1. Egg
- ☐ 2. Milk
- ☐ 3. Wheat
- ☐ 4. Shell fish (crustaceans)
- ☐ 5. Fruits
- ☐ 6. Peanuts
- ☐ 7. Buckwheat
- ☐ 8 Nuts
- ☐ 9. Fish
- ☐ 10 Fish eggs
- ☐ 11. Sesame
- ☐ 12. Soy

1-3. Please answer this question only if the parent selected "3: The child is currently diagnosed as food allergy and undergoing treatment and school support" as the answer in Q1.
Please circle every food item that applies for each of the following questions. (As many as they apply.)

	Removed by physician's instructions	Removed at the parent's discretion	The child accidentally ingested it and symptoms were induced.
1. Egg	☐	☐	☐
2. Milk	☐	☐	☐
3. Wheat	☐	☐	☐
4. Shell fish (crustaceans)	☐	☐	☐
5. Fruits	☐	☐	☐
6. Peanuts	☐	☐	☐
7. Buckwheat	☐	☐	☐
8 Nuts	☐	☐	☐
9. Fish	☐	☐	☐
10 Fish eggs	☐	☐	☐
11. Sesame	☐	☐	☐
12. Soy	☐	☐	☐
13. Others ( )	☐	☐	☐

1-4. Please answer this question only if the parent selected "3: The child is currently diagnosed as food allergy and undergoing treatment and school support" as the answer in Q1.
Is the current school support for food allergy based on the medical certificate of a physician?

1. Yes, professional instructions from physicians, such as a medical certificate or the School Life Management Instruction Table (For Allergy), have been submitted to a school to request for their support accordingly.
2. No, no professional instructions from physicians was submitted to a school, but the parent has requested or filed a request form to ask school for support.

☐

Q2. <u>All parents are requested to answer the following questions REGARDLESS of the diagnosis of bronchial asthma.</u>

2-1. Has a child experienced any wheezing or whistling in the chest <u>in the last 12 months</u>?

1. Yes → Please proceed to the next sub-question (Q2-2).
2. No → Please proceed to the next question (Q3).

☐

2-2. How often did your child experience wheezing attacks <u>in the last 12 months</u>?

1. 0 time
2. 1 to 3 times
3. 4-12 times
4. 13 times or more

2-3. During <u>the last 12 months</u>, how often was your child's sleep disrupted by the wheezing on average?

1. Never
2. Once every few months at night
3. Once a month at night
4. Once a week at night
5. More than once a week at night

☐

2-4. During <u>the last 12 months</u>, was your child ever wheezing so hard that he/she could barely speak a word or two between breaths?

1. Yes
2. No

☐

Q3.All parents are requested to answer this question.

Has the child ever experienced anaphylaxis or any anaphylactic shock before?

1. Never
2. The child has experienced anaphylaxis, but not an anaphylactic shock.
3. The child has experienced an anaphylactic shock.

☐

* *Anaphylaxis* is defined as "a state in which multiple symptoms on skin (urticaria, itching, etc.), membranes (swollen lips, eye lids, etc.), the respiratory system (coughing, wheezing, etc.), and/or the digestive system (vomiting, diarrhea, abdominal pain, etc.) appear systematically."
* *Anaphylactic shock* is defined as "a state in which more serious conditions of anaphylactic symptoms appear, such as being listless or semiconscious, having a pale face, or not responding to a call or stimulus."

Q4.All parents are requested to answer this question.

Does the child currently carry epinephrine auto injector**?**
1. No
2. Yes, and the child is receiving school support.
3. Yes, but the child is not receiving school support.

☐

For Class room teacher or Nursing Teacher (YOGO Teacher)

3. Investigation of *risk factors for lifestyle-related disease*

A class room teacher or Nursing Teacher (YOGO Teacher) is requested to answer this page (Investigation 3) after collecting the questionnaire from the school children and students who completed the Questionnaires 1 and 2. Please note that these data will be used only for the statistical analysis purpose and that they will never be used as personal information.

[Caution]

This survey form consists of a set of 3 questionnaires, so please ensure not to cut apart any questionnaire sheets. If any sheet comes apart, you must use a staple or tape to attach it back.

Please enter the test result (or corresponding number) for each of the following items of "A" through "G," and enter the month of the test in the boxes.

A. Body height ☐☐☐.☐ cm ☐☐ (Month)

B Body weight ☐☐☐.☐ kg ☐☐ (Month)

C Waist circumference ☐☐☐.☐ cm

D Blood pressure Systolic ☐☐☐ mmHg / Diastolic ☐☐☐ mmHg ☐☐ (Month)

E. Blood lipids (total cholesterol) ☐☐☐ mg/dl ☐☐ (Month)

F. Blood lipids (HDL cholesterol) ☐☐☐ mg/dl ☐☐ (Month)

F. Blood lipids (LDL cholesterol) ☐☐☐ mg/dl ☐☐ (Month)

School level (1. Elementary school 2. Junior high School 3. Senior high school) ☐

School age ☐ th grade

Gender (1. Man 2. Woman) ☐

Birth month ☐☐ (Month)

Prefecture code ☐☐

School code ☐☐

Thank you for your cooperation.

---------- (Cutting Line) ----------

* Before submitting to JSSH, please be sure to cut along the line above or cover the name below with black ink.

Name

This report has been prepared by the Health Surveillance of School Children and Students Project Committee installed in the Public Interest Incorporated Foundation Japan Society of School Health (JSSH) under the Ministry of Education, Culture, Sports, Science and Technology's grand (the grand for health and education promotion projects).

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