Counting the Same Children with Two Measures in 2006, When the Measure for Obesity Tendency Changed, the New Measure Gave More Children with Obesity Tendency at All 13 Ages (+0.06 to +2.76 Points) and Fewer with Thinness Tendency at All Ages (−2.02 to −0.09) — This Step Is Several Times a Year-to-Year Movement, and Relinking 1977→2025, the Rise in Obesity Tendency at Age 12 Shrinks from +4.46 to +3.51 (Ratio Link) and +2.99 (Difference Link), While the Rise in Thinness Tendency Grows from +2.31 to +2.79 and +3.44 [M108]

Apparent yearly difference = change in children + difference in the measure ── What separates them is whether the measure changed or the children changed

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Abstract

In the yearly statistics of the Ministry of Education, Culture, Sports, Science and Technology's School Health Statistics Survey (Table 13, children with obesity tendency, and Table 14, children with thinness tendency, school years 1977–2025), the way of counting (the measure) changed in 2006. For that year only, the table lists values for the same children counted with both the old and the new measure. Using this overlap, this paper separated the yearly difference into the part from the change in the measure and the part from the change in children. No new mathematical theorem and no new law are claimed.

First, **counting the same children with two measures in 2006, obesity tendency (total) was higher under the new measure at all 13 ages (+0.06 to +2.76 points), and thinness tendency (total) was**

lower at all ages (−2.02 to −0.09). At age 17, obesity tendency went from 8.54% to 11.30% (1.323 times) and thinness tendency from 3.33% to 1.31% (0.393 times) (Section 4).

Second, **at ages 6–14, this difference in the measure (median of absolute values 1.06 points for obesity and 0.76 for thinness) was 4.8 and 6.9 times the difference between adjacent years within the same measure (medians 0.22 and 0.11), and larger than the largest difference between adjacent years (1.17 and 0.67)** (Section 4).

Third, this is the core of the paper. **Comparing 1977 (old measure) and 2025 (new measure) directly, obesity tendency at age 12 appears to rise by +4.46 points and thinness tendency by +2.31. Converting 1977 to the new measure using the 2006 overlap, the rise in obesity tendency becomes +3.51 (ratio link) and +2.99 (difference link), and in thinness tendency +2.79 and +3.44. At every age from 6 to 14, relinking makes the rise in obesity tendency smaller and the rise in thinness tendency larger** (Section 5).

Fourth, **thinness tendency at age 6 looks nearly unchanged when compared directly (+0.02 points), but relinked it rose by +0.19 (ratio) and +0.22 (difference)** (Section 5).

Fifth, **within the new measure (2006–2025), obesity tendency at age 12 was 11.73% (2006) → 9.86% (2019) → 11.10% (2025), and thinness tendency 2.74% → 3.59% → 3.94%** (Section 6).

Sixth, what separates them is **whether the measure changed or the children changed**. When reading "increased" or "decreased" over a long series, check whether the way of counting changed along the way.

Scope note: **This paper claims no new mathematical theorem and no new law** — the rates of obesity and thinness tendency and the values under the two calculation methods in 2006 are in public tables, and this paper only took differences and ratios and relinked the series. **This paper is a structural interpretation of the shape of numbers in public aggregate data; it is not medical advice, not a diagnosis, and not a treatment recommendation. The author is not a physician. Decisions about individual health should be discussed with a physician or a medical institution. This is a preprint that has not been peer reviewed. "Obesity tendency" and "thinness tendency" are statistical categories set from weight for height, and do not say whether any one child's body shape is good or bad. The reasons the categories changed and which measure is better are not discussed. Nor are the reasons the shares of children moved (food, exercise, daily life, and so on).** Relinking relies only on the single overlapping year 2006, and the result changes depending on whether one links by ratio or by difference. Which is right cannot be decided from these tables, so both are shown. Following the note to Table 10, 2020–2023 were excluded from the comparisons. The tables measure different children each year. **About the data**: the School Health Statistics Survey (Ministry of Education, Culture, Sports, Science and Technology) was taken from e-Stat and used under the Government of Japan Standard Terms of Use (Version 2.0); the differences, ratios, relinked values, and medians of adjacent-year differences in this paper were processed from it. What this paper adds: **using the 2006 overlap, in which the same children were counted with two measures, to split long-term differences into a part from the measure and a part from the children**.

1. Notation and question

- **Obesity tendency, thinness tendency**: as defined in the table's note. From 1977 to 2005 (old measure), average weight for height was found by sex and age, and children at 120% or more of it (80% or less for thinness) were counted. From 2006 (new measure), the degree of obesity was found

from standard weight for height, and children at a degree of obesity of 20% or more (−20% or less for thinness) were counted.

- **Difference in the measure**: in 2006, new − old (points) and new ÷ old (times). The difference from counting the same children in the same year in two ways.
- **Relinking**: converting the old 1977 value to the new measure. Ratio link = old value × (new ÷ old in 2006); difference link = old value + (new − old in 2006).

Question: Of the difference from 1977 to 2025, how much is the part from the change in the measure, and how much from the change in children?

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2. Preview and design

Written honestly: the design was decided after looking at the tables.

	Content
Tables	Yearly statistics Table 13 (obesity tendency) and Table 14 (thinness tendency), rates over 1977–2025 (total, boys, girls); Table 10 (only to read its note)
Noticed in the preview	Only 2006 has two rows; the upper row is the old calculation method and the lower row the new one (note 3 to the table)
Noticed in the preview (2)	Thinness tendency at age 17 is 3.33% old and 1.31% new, more than 2 times different for the same children
Noticed in the preview (3)	Old-measure values exist from 1977 only for ages 6–14; ages 5 and 15–17 have them only for 2006
Comparison	The difference in the measure in 2006 (total, boys, girls), its size compared with adjacent-year differences, relinking 1977→2025 (ratio and difference), and movement within the new measure

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3. Data and checks

Calculation 3.1 The 3 retrieved files were fixed by SHA-256, and the following were checked.

- Tables 13 and 14 each have 3 sheets (total, boys, girls), ages 5–17, school years 1977–2025, and only 2006 has two rows.
- The table notes give the old measure (120% or more, or 80% or less, of average weight for height), the new measure (degree of obesity 20% or more, or −20% or less), and that the upper row for 2006 uses the old calculation method.
- Old-measure values exist for age 6 in the 30 years 1977–2006, and for ages 5, 15, and 17 only in 2006.
- Following the note to Table 10 (Reiwa 2–5 cannot be compared with the past; the same applies to the following tables), 2020–2023 were excluded from the comparisons.

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4. 2006: counting the same children with two measures

Calculation 4.1 Rates in 2006 (total, %)

Age	Obesity, old	Obesity, new	Difference	Thinness, old	Thinness, new	Difference
6	4.76	5.34	+0.58	0.64	0.44	−0.20
9	8.34	9.70	+1.36	2.44	1.66	−0.78
12	10.26	11.73	+1.47	3.87	2.74	−1.13
14	8.78	10.22	+1.44	3.18	2.10	−1.08
15	9.63	11.98	+2.35	3.90	2.10	−1.80
17	8.54	11.30	+2.76	3.33	1.31	−2.02

Observation 4.2: **For the total, obesity tendency is higher under the new measure at all 13 ages (+0.06 to +2.76), and thinness tendency is lower at all ages (−2.02 to −0.09). At 17, obesity tendency is 1.323 times and thinness tendency 0.393 times.** By sex, the direction reverses only for obesity in girls aged 5 (−0.05) and thinness in girls aged 10 (+0.32).

Observation 4.3: **At ages 6–14, the median of the absolute difference in the measure was 1.06 points for obesity and 0.76 for thinness, 4.8 and 6.9 times the medians of the 387 adjacent-year differences within the same measure (0.22 and 0.11). The largest difference in the measure (1.47 and 1.13) is larger than the largest adjacent-year difference (1.17 and 0.67).** The step in the year the counting changed is larger than an ordinary year's movement.

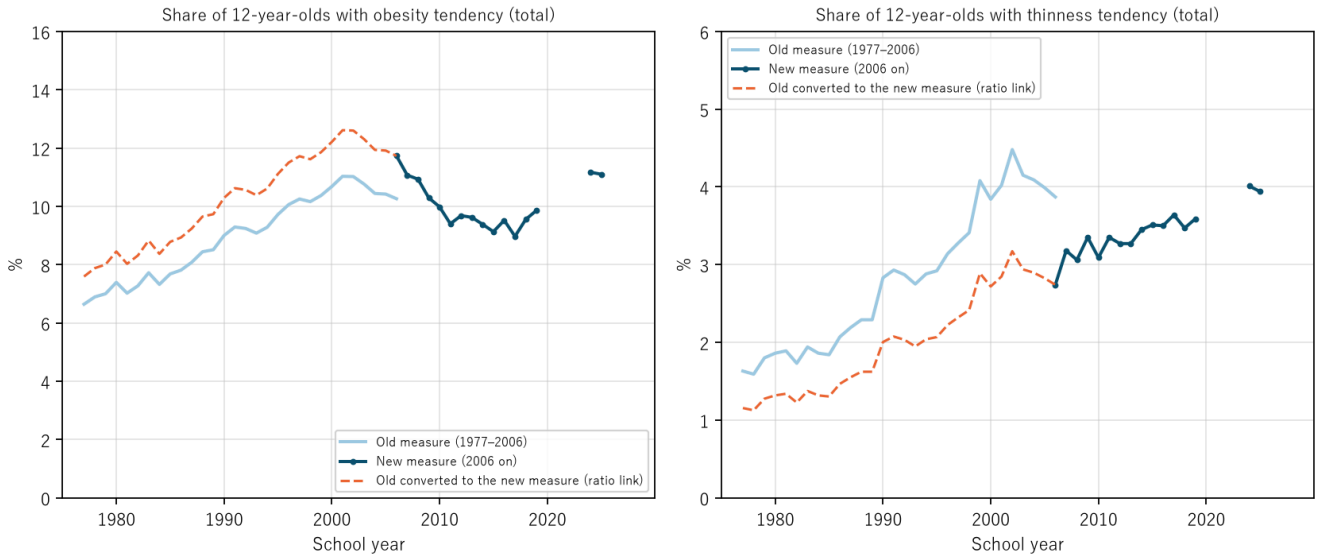


Figure 1: Shares of 12-year-olds with obesity tendency (left) and thinness tendency (right) (total). Light blue is the old measure (1977–2006), navy the new measure (2006 on; 2020–2023 excluded), and the orange dashed line the old values converted to the new measure by the ratio link.

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5. The core — relinking 1977 and 2025

Calculation 5.1 Obesity tendency (total, points)

Age	1977 (old)	2025 (new)	Direct difference	Ratio link	Difference link
6	2.62	4.31	+1.69	+1.37	+1.11
9	5.26	10.29	+5.03	+4.17	+3.67
12	6.64	11.10	+4.46	+3.51	+2.99
14	4.91	9.08	+4.17	+3.36	+2.73

Calculation 5.2 Thinness tendency (total, points)

Age	1977 (old)	2025 (new)	Direct difference	Ratio link	Difference link
6	0.53	0.55	+0.02	+0.19	+0.22
9	0.86	1.68	+0.82	+1.09	+1.60
12	1.63	3.94	+2.31	+2.79	+3.44
14	1.49	3.26	+1.77	+2.28	+2.85

Observation 5.3: **At age 12, the direct rise (obesity +4.46, thinness +2.31) becomes, after relinking, +3.51 and +2.99 for obesity and +2.79 and +3.44 for thinness. At every age from 6 to 14, with either the ratio link or the difference link, the rise in obesity tendency became smaller and the rise in thinness tendency larger.** Because the new measure counts more obesity and less thinness, a direct comparison makes the rise in obesity look larger and the rise in thinness look smaller.

Observation 5.4: **Thinness tendency at age 6 is +0.02 when compared directly, but +0.19 (ratio) and +0.22 (difference) after relinking.** "Nearly unchanged" was an appearance in which the difference in the measure cancelled the change.

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6. Movement within the new measure

Calculation 6.1 Rates under the new measure (total, %)

Age, category	2006	2019	2024	2025	Year of maximum
12, obesity	11.73	9.86	11.17	11.10	2006
9, obesity	9.70	9.24	10.22	10.29	2025
17, obesity	11.30	9.29	9.16	9.69	2006
12, thinness	2.74	3.59	4.01	3.94	2024
14, thinness	2.10	2.50	3.33	3.26	2024
17, thinness	1.31	2.20	2.89	2.91	2025

Observation 6.2: **Within the new measure, thinness tendency rose from 2006 at ages 12, 14, and 17, with its maximum in 2024 or 2025. Obesity tendency had its maximum in 2006 at ages 12 and 17, and in 2025 at age 9.** Within the old measure, the maximum at age 12 was 11.03% in 2001 for obesity tendency and 4.48% in 2002 for thinness tendency.

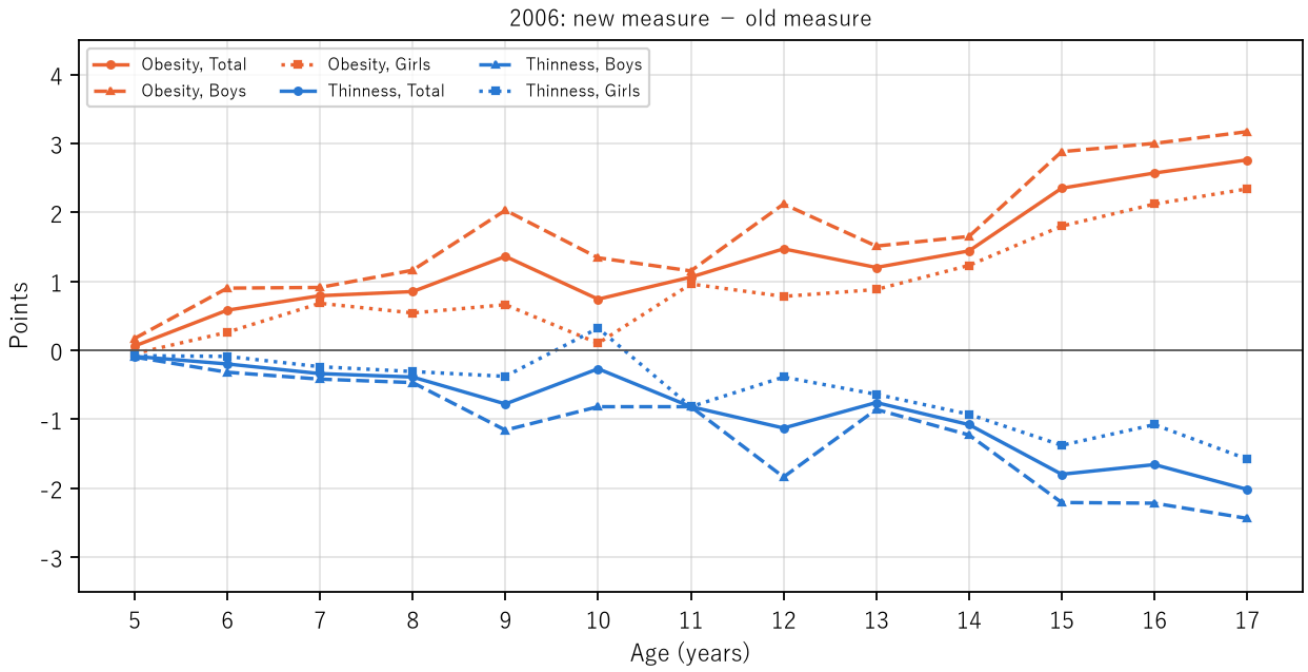


Figure 2: In 2006, new measure − old measure (points). Orange is obesity tendency, blue thinness tendency (solid for total, dashed for boys, dotted for girls).

7. Limitations

1. **"Obesity tendency" and "thinness tendency" are statistical categories and do not say whether any one child's body shape is good or bad. The reasons the categories changed, which measure is better, and the reasons the shares moved are not discussed.**
2. Relinking relies only on the single overlapping year 2006. The result depends on linking by ratio or by difference, and which is right cannot be decided from these tables. There is no guarantee that the ratio or difference of 2006 applies to children in 1977.
3. Ages 5 and 15–17 have old-measure values only for 2006, so the long series was not relinked for them.
4. 2020–2023 were excluded following the note to Table 10. The tables measure different children each year.

Conclusion

Counting the same children with two measures in 2006, obesity tendency was higher and thinness tendency lower under the new measure. That step was several times an ordinary year's movement. Relinking 1977 and 2025, the rise in obesity tendency at age 12 shrank from +4.46 to +3.51 and +2.99 points, and the rise in thinness tendency grew from +2.31 to +2.79 and +3.44 points.

What separates them is one thing — whether the measure changed or the children changed.

When reading "increased" or "decreased" over a long series, **check whether the way of counting changed along the way, and whether values under both ways of counting are listed for the year it changed.**

Data and reproduction

Data	School Health Statistics Survey, yearly statistics, Table 13 (rates of obesity tendency by age) and Table 14 (rates of thinness tendency by age), 1977–2025, and Table 10 (for its note) (Ministry of Education, Culture, Sports, Science and Technology, e-Stat) (retrieved 26 and 27 September 2026)
Terms of use	e-Stat follows the Government of Japan Standard Terms of Use (Version 2.0). The differences, ratios, relinked values, and medians of adjacent-year differences in this paper were processed from it and are not numbers produced by the government
Coverage	Japan; 1977–2025; ages 5–17 (old measure for ages 6–14); total and by sex
Verification	`検算/M108.py` (`--zu` also draws the figures). Every number in the text is taken from `検算/M108_output.txt`
Raw data	`data/` holds the retrieved files and `SOURCES.md` (URLs, retrieval dates, SHA-256, terms of use, definitions and how the calculations were set up)
Figures	`図/M108_zu1` and `図/M108_zu2` (png, svg, English versions)

References

- Ministry of Education, Culture, Sports, Science and Technology. School Health Statistics Survey, yearly statistics, Table 13: Rates of obesity tendency by age and Table 14: Rates of thinness tendency by age (1977–2025) (in Japanese). e-Stat (accessed 27 September 2026). https://www.e-stat.go.jp/