

Supplementary Material

Table S1. Program Overview.

| | | Before | Implementation period | | | | | | | | | | | | Immediately after | Continued Evaluation | | |
|------------------------|-----------|---|-----------------------|------|------|------|-----|--------------|------|------|-----|------------|------|------|----------------------|-------------------------|-----|------|
| MONTH | | | 1st | | | | 2nd | | | | 3rd | | | | | 4th | 5th | 6th |
| DAY | | | 5/30 | 6/13 | 6/20 | 6/27 | 7/4 | 7/10 7/11 | 7/18 | 7/25 | 8/1 | 8/7 8/8 | 8/15 | 8/22 | | 8/29 | 9/4 | 10/2 |
| WEEK | | -2 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 16 | 20 | 24 |
| Program Flow | SDT group | Seminar (60 minutes) | ✓ | | | | ✓ | | | | ✓ | | | | | | | |
| | | + worksheet (30 minutes) | ✓ | | | | ✓ | | | | ✓ | | | | | | | |
| | | Share meal photos and your issues (Online Communication Tools) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | | + follow-up (mail) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | COT group | Seminar (60 minutes) | ✓ | | | | ✓ | | | | ✓ | | | | | | | |
| | | Free, contact dietitian if you have questions (Online Communication Tools) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| Survey and measurement | | Research Description and Consent Form | ✓ | | | | | | | | | | | | | | | |
| | 1 | Anthropometric measurements (Height, weight, body fat percentage) | ✓ | | | ✓ | | | | ✓ | | | ✓ | | ✓ | ✓ | ✓ | ✓ |
| | 2 | Sports Nutrition Knowledge (SNK) | ✓ | | | | | | | | | | | | ✓ | | | ✓ |
| | 3 | Treatment self-regulation questionnaire (TSRQ) | ✓ | | | | | | | | | | | | ✓ | ✓ | ✓ | ✓ |
| | 4 | Brief-type self-administered diet history questionnaire (BDHQ) | ✓ | | | | | | | | | | | | ✓ | | | ✓ |

SDT group: Self-Determination Theory group COT group: Control group

Table S2. Between-group differences in anthropometric measurements, SNK and TSRQ.

| | Self-Determination Theory group (<i>n</i> = 14) | | | Control group (<i>n</i> = 17) | | | <i>p</i> value [†] |
|---|--|-------------------|--------------------|--------------------------------|-------------------|--------------------|-----------------------------|
| | Before | Immediately after | After three months | Before | Immediately after | After three months | |
| | mean value±SD | mean value±SD | mean value±SD | mean value±SD | mean value±SD | mean value±SD | |
| Anthropometric measurements | | | | | | | |
| Age (yrs) | 19.6 ± 1.5 | 19.9 ± 1.6 | 19.9 ± 1.6 | 19.6 ± 1.3 | 19.9 ± 1.5 | 19.9 ± 1.5 | 0.973 |
| Height (cm) | 173.9 ± 4.8 | 173.9 ± 4.8 | 173.9 ± 4.9 | 173.1 ± 5.6 | 172.9 ± 5.5 | 172.8 ± 5.7 | 0.682 |
| Weight (kg) | 72.0 ± 7.9 | 71.5 ± 6.2 | 72.4 ± 6.0 | 68.3 ± 6.2 | 69.2 ± 6.3 | 69.6 ± 5.4 | 0.152 |
| Body fat (%) | 14.6 ± 4.1 | 14.3 ± 3.9 | 14.4 ± 3.0 | 14.0 ± 4.3 | 12.7 ± 3.9 | 13.3 ± 3.4 | 0.712 |
| Lean body mass (kg) | 61.4 ± 5.7 | 61.2 ± 5.6 | 62.0 ± 5.6 | 58.8 ± 7.1 | 60.4 ± 5.8 | 60.3 ± 4.8 | 0.290 |
| Lean body mass/m (kg) | 35.3 ± 2.8 | 35.2 ± 2.7 | 35.6 ± 2.5 | 33.9 ± 3.4 | 34.9 ± 2.5 | 34.8 ± 2.0 | 0.251 |
| SNK | | | | | | | |
| Total SNK score (%) | 78.6 ± 12.5 | 87.2 ± 7.5 | 87.2 ± 8.0 | 75.6 ± 10.1 | 83.6 ± 8.3 | 79.0 ± 15.9 | 0.475 |
| Energy and refueling (%) | 84.5 ± 12.2 | 90.5 ± 12.6 | 91.7 ± 10.8 | 77.5 ± 19.5 | 86.3 ± 14.7 | 81.4 ± 17.6 | 0.228 |
| Hydration (%) | 100.0 ± 0.0 | 100.0 ± 0.0 | 100.0 ± 0.0 | 100.0 ± 0.0 | 100.0 ± 0.0 | 94.1 ± 16.6 | — |
| Supplements (%) | 81.0 ± 25.2 | 81.0 ± 17.1 | 76.2 ± 15.6 | 74.5 ± 30.1 | 78.4 ± 23.4 | 74.5 ± 25.1 | 0.529 |
| Protein (%) | 50.0 ± 28.5 | 78.6 ± 28.1 | 81.0 ± 21.5 | 56.9 ± 22.9 | 72.5 ± 27.0 | 68.6 ± 24.9 | 0.463 |
| TSRQ | | | | | | | |
| Autonomous motivation subscale | 5.05 ± 0.96 | 5.48 ± 0.93 | 5.44 ± 1.09 | 5.29 ± 1.34 | 5.49 ± 0.99 | 5.40 ± 1.06 | 0.568 |
| Externally controlled motivation subscale | 3.07 ± 1.07 | 2.81 ± 1.12 | 3.27 ± 1.34 | 2.92 ± 1.12 | 3.23 ± 0.92 | 3.70 ± 1.34 | 0.708 |
| Nonmotivation subscale | 2.74 ± 1.10 | 2.67 ± 0.93 | 3.14 ± 1.25 | 3.08 ± 1.48 | 3.18 ± 1.22 | 3.12 ± 1.41 | 0.482 |
| Relative Autonomous Motivation Index | 1.98 ± 1.62 | 2.67 ± 1.64 | 2.17 ± 1.93 | 2.37 ± 1.53 | 2.26 ± 1.19 | 1.71 ± 1.89 | 0.490 |

[†] No paired t-test was performed for differences between groups before the start of the study.

SD: Standard Deviation

SNK: Sports Nutrition Knowledge

TSRQ: Treatment Self-Regulation Questionnaire

Table S3. Between-group differences in BDHQ.

| | Self-Determination Theory group (n = 14) | | | | | | Control group (n = 17) | | | | | | p value† |
|---------------------------------|--|----------|-------------------|----------|--------------------|----------|------------------------|----------|-------------------|----------|--------------------|----------|----------|
| | Before | | Immediately after | | After three months | | Before | | Immediately after | | After three months | | |
| | | | | | | | | | | | | | |
| | mean | mean | mean | mean | mean | mean | mean | mean | | | | | |
| | value±SD | value±SD | value±SD | value±SD | value±SD | value±SD | value±SD | value±SD | value±SD | value±SD | value±SD | value±SD | |
| BDHQ (Nutrient intake) | | | | | | | | | | | | | |
| Energy (kcal) | 2764± | 912 | 3224± | 541 | 3295± | 713 | 3000± | 679 | 3118± | 756 | 3165± | 919 | 0.416 |
| Protein (g) | 83.5± | 32.9 | 95.8± | 24.8 | 97.6± | 28.7 | 94.1± | 27.2 | 95.9± | 26.3 | 104.2± | 34.6 | 0.334 |
| Fat (g) | 63.5± | 22.3 | 68.2± | 20.0 | 69.0± | 19.8 | 75.5± | 21.3 | 76.7± | 27.6 | 75.5± | 34.5 | 0.137 |
| Carbohydrate (g) | 448.5± | 148.8 | 539.8± | 93.3 | 551.2± | 118.5 | 468.3± | 124.4 | 494.7± | 117.4 | 499.7± | 132.4 | 0.690 |
| Calcium (mg) | 528.7± | 325.0 | 633.7± | 251.7 | 601.2± | 296.5 | 523.6± | 161.2 | 659.6± | 233.0 | 615.8± | 185.2 | 0.958 |
| Iron (mg) | 8.2± | 4.0 | 9.4± | 2.8 | 9.3± | 4.1 | 8.5± | 2.1 | 9.4± | 3.3 | 10.1± | 3.7 | 0.850 |
| Vitamin D (µg) | 8.4± | 4.4 | 9.2± | 6.0 | 10.2± | 6.1 | 7.5± | 5.2 | 8.1± | 4.7 | 13.3± | 11.3 | 0.597 |
| Vitamin B ₁ (mg) | 0.9± | 0.4 | 1.1± | 0.2 | 1.1± | 0.3 | 1.0± | 0.3 | 1.1± | 0.4 | 1.2± | 0.4 | 0.455 |
| Vitamin C (mg) | 115.9± | 54.8 | 141.7± | 59.4 | 132.1± | 74.0 | 102.5± | 47.2 | 131.8± | 79.2 | 131.3± | 65.4 | 0.469 |
| Dietary fiber (g) | 12.3± | 5.4 | 13.6± | 4.1 | 13.8± | 4.9 | 13.5± | 3.7 | 14.4± | 5.4 | 14.8± | 5.3 | 0.461 |
| BDHQ (Intake by food group) ** | | | | | | | | | | | | | |
| Cereal grains (g) | 955.3± | 305.6 | 1099.6± | 245.1 | 1193.5± | 268.2 | 1020.1± | 327.9 | 1022.3± | 207.5 | 1074.9± | 285.0 | 0.577 |
| Potatoes (g) | 25.8± | 25.1 | 26.2± | 38.8 | 28.9± | 22.5 | 31.3± | 32.8 | 30.8± | 32.0 | 42.5± | 42.4 | 0.610 |
| Sugar and sweeteners (g) | 2.7± | 2.5 | 2.9± | 2.7 | 3.6± | 2.1 | 2.5± | 2.0 | 2.3± | 1.6 | 3.4± | 1.9 | 0.861 |
| Pulses (g) | 67.4± | 67.1 | 76.4± | 72.8 | 53.0± | 56.9 | 46.6± | 34.2 | 62.5± | 42.5 | 52.5± | 30.5 | 0.305 |
| Green and yellow vegetables (g) | 126.7± | 70.6 | 159.1± | 74.2 | 138.0± | 81.8 | 99.8± | 69.2 | 159.9± | 99.3 | 146.6± | 83.6 | 0.295 |
| Other vegetables (g) | 125.0± | 75.8 | 113.5± | 61.6 | 137.4± | 75.5 | 174.5± | 95.7 | 150.2± | 106.9 | 163.4± | 78.2 | 0.127 |
| Fruits (g) | 195.2± | 146.1 | 306.0± | 196.2 | 221.4± | 147.8 | 133.2± | 152.4 | 215.3± | 208.6 | 180.5± | 139.9 | 0.261 |
| Fish and shellfish (g) | 48.0± | 29.5 | 64.7± | 41.2 | 62.9± | 44.3 | 37.2± | 30.8 | 51.3± | 38.6 | 71.2± | 76.2 | 0.330 |
| Meats (g) | 104.2± | 46.1 | 111.8± | 33.4 | 122.2± | 42.9 | 156.2± | 86.9 | 134.5± | 60.1 | 153.8± | 87.9 | 0.043 * |
| Eggs (g) | 57.6± | 50.9 | 60.1± | 53.6 | 62.9± | 50.7 | 65.8± | 36.4 | 65.0± | 49.3 | 68.2± | 41.8 | 0.606 |
| Dairy products (g) | 183.3± | 167.9 | 257.0± | 147.0 | 219.7± | 146.4 | 177.3± | 93.3 | 262.6± | 134.4 | 184.8± | 95.7 | 0.900 |
| Fats and oils (g) | 16.4± | 4.4 | 15.6± | 5.5 | 16.8± | 6.6 | 23.7± | 8.3 | 20.7± | 7.8 | 18.7± | 12.1 | 0.004 * |
| Confectioneries(g) | 11.5± | 11.2 | 7.4± | 9.5 | 14.0± | 16.1 | 25.6± | 52.5 | 12.8± | 23.7 | 18.8± | 22.5 | 0.333 |
| Beverages (g) | 445.7± | 289.3 | 656.5± | 443.9 | 529.1± | 518.1 | 375.9± | 318.7 | 482.4± | 463.8 | 382.5± | 351.1 | 0.532 |
| Seasonings and spices (g) | 174.6± | 147.9 | 298.0± | 191.4 | 255.6± | 177.7 | 268.0± | 186.7 | 289.7± | 150.1 | 285.9± | 239.6 | 0.140 |

* *p* < 0.05: Significant difference

† No paired t-test was performed for differences between groups before the start of the study.

SD: Standard Deviation

BDHQ: Brief-type self-administered diet history questionnaire

**Foods in each food group

Cereal grains : bread, buckwheat, udon (thick wheat noodles), Chinese noodles, pasta, meshi (cooked rice)

Potatoes : potato(All types) Sugar and sweeteners : sugars, cooking sugar Pulses : tofu, fried tofu, natto

Green and yellow vegetables : broccoli, carrots, pumpkin, tomatoes Other vegetables : lettuce, cabbage, radish, root vegetables

Fruits : oranges, strawberries Fish and shellfish : fish, squid, octopus, shrimp, shell Meats : chicken, pork, beef, ham

Eggs : eggs Dairy products : milk, ice cream Fats and oils : cooking oil

Confectioneries : western confectionery (cake, biscuits, crackers, snacks, chocolate), Japanese confectionery(rice crackers)

Beverages : green tea, black tea, oolong tea, coffee, cola, Japanese sake, beer shochu, whiskey, wine

Seasonings and spices : salt, mayonnaise, soy sauce, miso soup, noodles soup

Table S4. Results of between-group and within-group factor analyses of anthropometrics, SNK, and TSRQ.

| | Grouping factor | Within-group factor | | | | |
|------------------------------------|--|---|--|---|--|---|
| | Reciprocal action Group × Time <i>p</i> [†] | Time Main Effects <i>p</i> [†] | Immediately after — Before <i>p</i> [‡] | After three months — Before <i>p</i> [‡] | After three months — Immediately after <i>p</i> [‡] | Multiple comparison test |
| Anthropometric measurements | | | | | | |
| Age (y) | 0.993 | 0.099 | | | | |
| Height (cm) | 0.367 | 0.585 | | | | |
| Weight (kg) | 0.296 | 0.206 | | | | |
| Body fat (%) | 0.571 | 0.323 | | | | |
| Lean body mass (kg) | 0.253 | 0.154 | | | | |
| Lean body mass/m (kg) | 0.250 | 0.151 | | | | |
| SNK | | | | | | |
| Total SNK score | 0.510 | 0.004* | 0.003* | 0.078 | 1.000 | Before < Immediately after |
| Energy and refueling | 0.711 | 0.122 | | | | |
| Hydration | 0.183 | 0.183 | | | | |
| Supplements | 0.884 | 0.698 | | | | |
| Protein | 0.200 | < 0.001* | 0.002* | 0.002* | 1.000 | Before < Immediately after Before < After three months |
| TSRQ | | | | | | |
| Autonomous motivation subscale | 0.571 | 0.077 | | | | |
| Externally controlled motivation | 0.313 | 0.058 | | | | |
| Nonmotivation subscale | 0.311 | 0.378 | | | | |
| Relative Autonomous Motivation | 0.095 | 0.057 | | | | |

* *p* < 0.05: Significant difference
† A two-way ANOVA was conducted on the between-group and within-group factors.
‡ Multiple comparison tests using the Bonferroni method were performed for before, after, after three months for within-group factors.
< less than, > more than
SNK: Sports Nutrition Knowledge
TSRQ: Treatment Self-Regulation Questionnaire