HHS Public Access

Author manuscript

*J Nutr Educ Behav*. Author manuscript; available in PMC 2022 March 01.

Published in final edited form as:

*J Nutr Educ Behav*. 2021 March ; 53(3): 240–245. doi:10.1016/j.jneb.2020.11.015.

# Intuitive Eating is Associated With Higher Fruit and Vegetable Intake Among Adults

**Mary J. Christoph, PhD, MPH**[1], **Vivienne M. Hazzard, PhD, MPH, RD**[2], **Elina Järvelä-Reijonen, PhD, MSc, RD**[3], **Laura Hooper, MS, RD**[4], **Nicole Larson, PhD, MPH, RDN**[4], **Dianne Neumark-Sztainer, PhD, MPH, RD**[4]

[1]Division of General Pediatrics and Adolescent Health, School of Medicine, University of Minnesota, Minneapolis, MN [2]Sanford Center for Biobehavioral Research, Fargo, ND [3]Institute of Public Health and Clinical Nutrition, School of Medicine, University of Eastern Finland, Kuopio, Finland [4]Division of Epidemiology and Community Health, School of Public Health, University of Minnesota, Minneapolis, MN

## Abstract

**Objective:** Assess how intuitive eating relates to dietary intake.

**Methods:** Survey data were collected in *Project Eating and Activity in Teens and Young Adults*, the fourth wave of a longitudinal cohort study (weighted n = 1,830, 49% women; mean age = 31 years). Intuitive eating was assessed using a 7-item scale adapted from the Intuitive Eating Scale and Intuitive Eating Scale-2. Dietary intake was measured via a semiquantitative food frequency questionnaire. Mean servings were stratified by gender and intuitive eating quartiles and adjusted for sociodemographic characteristics and caloric intake.

**Results:** Women and men in the top intuitive eating quartile consumed 0.6–0.3 servings more fruit and 0.4–0.6 servings more vegetables daily, respectively, compared with the bottom quartile, whereas men in the top quartile also consumed 0.6 servings fewer whole grains (all $P < 0.05$) than the bottom quartile.

**Conclusions and Implications:** Intuitive eating shows promise as a healthier alternative to practices such as dieting.

### Keywords

intuitive eating; dietary intake; diet; healthy; appetite regulation

## INTRODUCTION

Dietary intake is driven by internal factors, such as hunger and emotional cues,[1] and external factors, such as food availability, distractions within the environment,[2] social context,[3]

Address for correspondence: Mary J. Christoph, PhD, MPH, Department of Health Economics and Outcomes Research, Portola Pharmaceuticals, 270 E Grand Ave, South San Francisco, CA 94080; marychristoph@gmail.com.

*Conflict of Interest Disclosure:* The authors have not stated any conflicts of interest.

palatability,[4] and portion size.[5] Prior research, primarily based on cross-sectional studies, has found that intuitive eating, the practice of making choices about when and how much to eat on the basis of physical hunger and satiety cues rather than external cues and rules,[6] positively relates to good psychological and health indicators such as higher emotional functioning,[7] lower risk of eating disorder symptomology,[8] and lower risk of high weight status.[8,9]

The most recent conceptualization of intuitive eating involves (1) reliance on hunger and satiety cues (RHSC), (2) eating for physical rather than emotional reasons, (3) unconditional permission to eat, and (4) practicing gentle nutrition by making food choices that honor health as well as taste (body-food choice congruence).[6,10] A limited number of studies have investigated the relationship between these intuitive eating components and different aspects of dietary quality,[11–13] and no clear patterns have emerged.[11] Therefore, more research is needed to understand better how intuitive eating is related to key components of the 2015–2020 US Dietary Guidelines for Americans (DGA).[14]

To address gaps in the knowledge of how intuitive eating relates to public health recommendations for dietary intake, this study examined cross-sectional associations between intuitive eating and dietary intake in a large, population-based sample of men and women.

## METHODS

### Study Design, Participants, and Recruitment

Data were collected in *Project Eating and Activity in Teens and Young Adults* (EAT-IV), the fourth wave of a longitudinal cohort study following adolescents into young adulthood. Adolescents from 31 public middle schools and high schools in the Minneapolis-St Paul metropolitan area completed baseline, in-classroom surveys during 1998–1999.[15] For EAT-IV, participants responding to at least 1 of the prior follow-up studies (EAT-II and/or EAT-III) were invited to participate during 2015–2016. Of initial participants in the school-based survey,[15] 1,830 (66.1% of those with valid contact information) responded to EAT-IV. The analytic sample included only participants who completed the intuitive eating scale (n = 1,817). The University of Minnesota Institutional Review Board approved the study, and participants provided written or online informed consent. At EAT-IV, participants were aged, on average, 31.1 ± 1.6 years; 57.1% (n = 1,037) identified as female and 42.9% (n = 780) as male; the population was 68.7% White, 14.7% Asian American, 8.3% African American, 3.4% Hispanic, and 4.9% mixed or other race/ethnicity. Weighted demographic characteristics by gender are reported in Table 1.

### Instruments and Measures

The EAT-IV survey was based on the initial Project EAT survey[15,16] with modifications to assess age-appropriate variables. Test-retest reliability was calculated for ordinal and continuous variables and percent agreement for categorical variables in a subgroup of 103 participants who completed the EAT-IV survey twice within a period of 1 to 4 weeks.

Intuitive eating was assessed via a 7-item scale adapted from the Intuitive Eating Scale (IES)[10] and IES-2,[6] which have been validated in adults for assessment of eating, body-related, and psychological measures.[6,10] To limit participant burden, these 7 items were chosen from the longer scales on the basis of their centrality to the core construct of intuitive eating. Six of the items assessed in the present study comprise the RHSC subscale of the IES-2[6]: "I trust my body to tell me when to eat," "I trust my body to tell me what to eat," "I trust my body to tell me how much to eat," "I rely on my hunger signals to tell me when to eat," "I rely on my fullness (satiety) signals to tell me when to stop eating," and "I trust my body to tell me when to stop eating." The seventh item assessed in the present study came from the Eating for Physical Rather Than Emotional Reasons subscale of the original IES[10]: "I stop eating when I feel full." Response options ranged from 1 = strongly disagree to 4 = strongly agree. Responses were summed, ranging from a low of 7 and a high of 28, with higher scores indicating greater intuitive eating (Cronbach $\alpha = 0.87$, test-retest reliability $r = 0.75$). Participant scores were then stratified by quartile to allow for comparison across intuitive eating quartiles. Intuitive eating quartiles were derived separately for men and women, and all analyses were stratified by gender on the basis of reported gender differences in awareness of the concept of intuitive eating[17] and the relationships between engagement in intuitive eating and health behaviors.[11,18] Gender-specific analyses also allowed for alignment with daily dietary intake guidelines, which differ by gender.[14]

Dietary outcomes were selected on the basis of key components of the 2015–2020 DGA[14] and the consumer-facing tool, MyPlate.[19] Daily servings of fruits, vegetables, protein, whole grains, dairy, and sugar-sweetened beverages (ie, sodas, sports drinks, punch, lemonade, sugared iced tea), as well as total fat, saturated fat, and total caloric intake, were measured via a semiquantitative food frequency questionnaire (FFQ).[20,21] Responses to the FFQ were excluded if participants reported a biologically implausible level of total energy intake (<500 kcal/d or >5,000 kcal/d) or left 20 or more items blank (excluded n = 161). A daily serving was defined as a one-half cup for fruits and vegetables, 16 grams for whole grains, and 1 cup for dairy. One serving of sugar-sweetened beverages was defined as the equivalent of 1 glass, bottle, or can. Protein, total fat, and saturated fat were measured in grams.[22]

Participants self-reported their ethnicity/race, education, and income on the survey via multiple-choice questions, and participants could choose multiple response categories for ethnicity/race. Age was calculated on the basis of birth date and survey completion date.

## Data Analysis

Weighted least-squares mean models were used to compare dietary intake at EAT-IV across each intuitive eating quartile, adjusted for age, ethnicity/race, socioeconomic status, and total caloric intake. The model assessing caloric intake as an outcome was adjusted for age, ethnicity/race, and socioeconomic status. Linear trend estimates with standard errors were calculated to measure the linear association between intuitive eating quartiles and each dietary component. Because loss-to-follow-up did not occur at random, analyses were weighted using response propensities[23] to make the sample more representative of the original school-based population. All $P$ values less than 0.05 were considered statistically

significant. All analyses were performed using SAS (version 9.4, SAS Institute, Inc, Cary, NC, 2016).

## RESULTS

Women in the top quartile of intuitive eating consumed 0.6 servings more fruit ($P = 0.001$) and 0.4 servings more vegetables ($P = 0.04$) daily compared with those in the bottom quartile (Table 2). No significant differences by intuitive eating quartile were observed among women in adjusted mean daily intake of whole grains, dairy, protein, total fat, saturated fat, calories, or sugar-sweetened beverages. Men in the top quartile of intuitive eating consumed an additional 0.3 servings more fruit ($P = 0.03$) and 0.6 servings more vegetables ($P = 0.01$) but 0.6 servings less of whole grains ($P < 0.001$) than nonintuitive eaters (Table 3). No significant differences were observed among men by intuitive eating quartile for daily intake of dairy, protein, total fat, saturated fat, calories, or sugar-sweetened beverages.

## DISCUSSION

This study aimed to elucidate the relationship between intuitive eating and dietary intake by examining cross-sectional associations among men and women in a large, population-based sample. In this sample, intuitive eating was related to modestly higher intakes of some key food groups recommended by the 2015–2020 DGA (ie, fruits and vegetables) among both women and men and was not related to intake of dietary components that the 2015–2020 DGA advises limiting (eg, sugar-sweetened beverages, saturated fat). However, among men, those in the top quartile for intuitive eating also consumed fewer whole grains than those in the bottom quartile, which could suggest that the relationship between intuitive eating and dietary intake may differ across dietary components.

The present study expanded on prior research by measuring the relationship between intuitive eating and dietary intake within a large population-based sample. Observed associations were more consistent across gender than prior research showing differing relationships between intuitive eating and dietary intake among women and men. In the French NutriNet-Sante cohort, higher levels of RHSC were associated with lower energy intake and higher whole grain intake among women but not men.[13] In the Swiss food panel study, eating for physical rather than emotional reasons and RHSC were correlated with dietary quality among women, but not among men.[11] In a college-student sample, RHSC was related to lower consumption of fruit and vegetable intake among men but not women.[12] While the findings across studies are not always consistent, results from the present study, within the context of prior research, suggest that intuitive eating is modestly associated with some markers of better dietary intake but not consistently associated with all markers of a healthy diet. These findings add to a growing body of evidence for the potential benefits of intuitive eating, as prior research has found intuitive eating to be associated with measures of positive health and well-being including emotional functioning,[7] lower risk of eating disorder symptomology[8] and lower risk of high weight status.[8,9]

Findings from the present Project EAT-IV analysis suggest that caloric intake, estimated via a semiquantitative FFQ, did not differ by intuitive eating quartiles. Whether intuitive eating relates to volume and energy intake of food consumed is unclear from prior research. In the NutriNet-Sante cohort, RHSC was associated with lower energy intake, assessed via multiple 24-hour dietary recalls, whereas unconditional permission to eat was associated with higher energy intake.[13] In laboratory studies, intuitive eating was related to increased meal consumption,[24] and unrelated to the intake of healthy foods or overall food intake.[25] Although studies in smaller limited populations have raised the concern that encouraging intuitive eating could increase energy intake,[24,26] the results of EAT-IV in the context of prior research suggest that at a population level, intuitive eating and RHSC specifically were not related to higher energy intake.

This study was limited by its cross-sectional nature. In addition, the sample was drawn from 1 geographic area, and generalizations to populations residing in other areas and from more diverse ethnic/racial and socioeconomic backgrounds should be made cautiously. Dietary intake was self-reported using a semiquantitative FFQ, which does not precisely measure volume of sugar-sweetened beverage intake or total caloric intake for individuals as well as other assessment methods (eg, multiple 24-hour dietary recalls)[27]; however, the FFQ used in this study has been validated,[20,21] and use of an FFQ further allowed for comprehensively measuring usual daily intake for the past year. Rigorous assessment of dietary intake is needed to assess the relationship between intuitive eating and alignment with biological requirements.

## IMPLICATIONS FOR RESEARCH AND PRACTICE

In Project EAT-IV, intuitive eating showed modestly beneficial cross-sectional associations with dietary intake. While intuitive eating for men was associated with a lower intake of whole grains, which is of concern, it is worth noting that in both genders, intuitive eating was not associated with a higher intake of low-nutrient, energy-dense foods such as sugar-sweetened beverages. Combined with prior evidence that intuitive eating is associated with a range of favorable psychological and physical health indicators,[7–9] our results suggest that engagement in intuitive eating may provide a healthy alternative to popular, yet problematic, practices such as dieting and the use of unhealthy weight control practices. Longitudinal research is needed to assess the long-term relationship between intuitive eating and dietary intake. Qualitative studies could investigate the relationship between intuitive eating and dietary patterns to assess which groups may benefit from intuitive eating interventions and better understand the impact of contextual factors such as the home and community food environment and social behaviors (ie, frequency of dieting and unhealthy weight control behaviors among family members, peers, and community) on the relationship between intuitive eating on dietary intake. An especially key gap for future research will be observing the impact of intuitive eating on dietary intake within food environments characterized by low-cost foods that are low in nutritional density, which could make healthy intuitive eating more challenging. It is critical that future research examine how practitioners can best guide young people toward intuitive eating while also helping them align their dietary intake in accordance with the US or other dietary guidelines.

## ACKNOWLEDGMENTS

Data collection was supported by Grant Number R01HL116892 from the National Heart, Lung, and Blood Institute (PI: Dianne Neumark-Sztainer). The authors' time to conduct and describe the analysis reported within this manuscript was supported by Grant Number R35HL139853 from the National Heart, Lung, and Blood Institute (PI: D. Neumark-Sztainer). MJC was supported by grant T32HP22239 from the Health Resources and Services Administration of the US Department of Health and Human Services under the National Research Service Award in Primary Medical Care (PI: I. Borowsky). VMH was supported by the National Institute of Mental Health through grant T32MH082761 (PI: S. Crow). The authors thank the Project EAT team and participants. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Heart, Lung, and Blood Institute; the National Institute of Mental Health; the National Institutes of Health; or the Health Resources and Services Administration.

## REFERENCES

1. Paans NPG, Gibson-Smith D, Bot M, et al. Depression and eating styles are independently associated with dietary intake. Appetite. 2019;134:103–110. [PubMed: 30583007]
2. Higgs S, Woodward M. Television watching during lunch increases afternoon snack intake of young women. Appetite. 2009;52:39–43. [PubMed: 18692103]
3. Cruwys T, Bevelander KE, Hermans RC. Social modeling of eating: a review of when and why social influence affects food intake and choice. Appetite. 2015;86:3–18. [PubMed: 25174571]
4. McCrickerd K, Forde CG. Sensory influences on food intake control: moving beyond palatability. Obes Rev. 2016;17:18–29. [PubMed: 26662879]
5. Myers KP, Brunstrom JM, Rogers PJ, Holtzman JD. Portion size influences intake in Samburu Kenyan people not exposed to the Western obesogenic environment. Appetite. 2019;133:212–216. [PubMed: 30445154]
6. Tylka TL, Kroon Van Diest AM. The Intuitive Eating Scale-2: item refinement and psychometric evaluation with college women and men. J Couns Psychol. 2013;60:137–153. [PubMed: 23356469]
7. Bruce LJ, Ricciardelli LA. A systematic review of the psychosocial correlates of intuitive eating among adult women. Appetite. 2016;96:454–472. [PubMed: 26474781]
8. Van Dyke N, Drinkwater EJ. Relationships between intuitive eating and health indicators: literature review. Public Health Nutr. 2014;17:1757–1766. [PubMed: 23962472]
9. Camilleri GM, M ejean C, Bellisle F, et al. Intuitive eating is inversely associated with body weight status in the general population-based NutriNet-Santé study. Obesity (Silver Spring). 2016;24:1154–1161. [PubMed: 26991542]
10. Tylka TL. Development and psychometric evaluation of a measure of intuitive eating. J Couns Psychol. 2006;53: 226–240.
11. Horwath C, Hagmann D, Hartmann C. Intuitive eating and food intake in men and women: results from the Swiss food panel study. Appetite. 2019;135:61–71. [PubMed: 30584896]
12. Barad A, Cartledge A, Gemmill K, et al. Associations between intuitive eating behaviors and fruit and vegetable intake among college students. J Nutr Educ Behav. 2019;51:758–762. [PubMed: 31003936]
13. Camilleri GM, M ejean C, Bellisle F, et al. Intuitive eating dimensions were differently associated with food intake in the general population-based NutriNet-Santé study. J Nutr. 2017;147: 61–69. [PubMed: 27798333]
14. US Department of Health and Human Services, US Department of Agriculture. 2015–2020 Dietary Guidelines for Americans. 8th ed. Washington, DC: US Department of Agriculture; 2015.
15. Neumark-Sztainer D, Story M, Hannan PJ, Croll J. Overweight status and eating patterns among adolescents: where do youths stand in comparison with the Healthy People 2010 objectives. Am J Public Health. 2002;92:844–851. [PubMed: 11988458]
16. Neumark-Sztainer D, Croll J, Story M, Hannan PJ, French SA, Perry C. Ethnic/racial differences in weight-related concerns and behaviors among adolescent girls and boys: findings from Project EAT. J Psychosom Res. 2002;53:963–974. [PubMed: 12445586]
17. Food Insight. Food and Health Survey. 2019. https://foodinsight.org/2019-food-and-health-survey/. Accessed September 23, 2020.

18. Hawks S, Merrill RM, Madanat HN. The Intuitive Eating Scale: development and preliminary validation. Am J Health Educ. 2004;35:90–99.
19. US Department of Agriculture. ChooseMyPlate. https://www.choosemy-plate.gov/. Accessed September 22, 2020.
20. Feskanich D, Rimm EB, Giovannucci EL, et al. Reproducibility and validity of food intake measurements from a semiquantitative food frequency questionnaire. J Am Diet Assoc. 1993;93: 790–796. [PubMed: 8320406]
21. Rimm EB, Giovannucci EL, Stampfer MJ, Colditz GA, Litin LB, Willett WC. Reproducibility and validity of an expanded self-administered semiquantitative food frequency questionnaire among male health professionals. Am J Epidemiol. 1992;135:1114–1126. [PubMed: 1632423]
22. Larson N, Haynos AF, Roberto CA, Loth KA, Neumark-Sztainer D. Calorie labels on the restaurant menu: is the use of weight-control behaviors related to ordering decisions. J Acad Nutr Diet. 2018;118:399–408. [PubMed: 29325890]
23. Little RJA. Survey nonresponse adjustments for estimates of means. Int Stat Rev. 1986;54:139–157.
24. Anderson LM, Reilly EE, Schaumberg K, Dmochowski S, Anderson DA. Contributions of mindful eating, intuitive eating, and restraint to BMI, disordered eating, and meal consumption in college students. Eat Weight Disord. 2016;21:83–90. [PubMed: 26243300]
25. Ruzanska UA, Warschburger P. How is intuitive eating related to self-reported and laboratory food intake in middle-aged adults? Eat Behav. 2020;38: 101405. [PubMed: 32599465]
26. Anglin JC, Borchardt N, Ramos E, Mhoon K. Diet quality of adults using intuitive eating for weight loss - pilot study. Nutr Health. 2013;22:255–264. [PubMed: 26399269]
27. Yuan C, Spiegelman D, Rimm EB, et al. Validity of a dietary questionnaire assessed by comparison with multiple weighed dietary records or 24-hour recalls. Am J Epidemiol. 2017;185:570–584. [PubMed: 28338828]

**Table 1.**

Weighted Sample Characteristics of Adults Surveyed in the Population-Based EAT-IV Survey in the Minneapolis-St Paul Metropolitan Area (n = 1,830)

| Characteristics | Women, % (n) | Men, % (n) |
|---|---|---|
| Total | 48.9 (894) | 51.1 (936) |
| Age, y, mean ± SD | 31.0 ± 1.6 | 31.1 ± 1.8 |
| Ethnicity/race | | |
| White | 46.9 (413) | 49.5 (460) |
| Black | 18.5 (162) | 19.1 (177) |
| Hispanic | 6.1 (53) | 5.4 (50) |
| Asian | 20.7 (182) | 18.2 (169) |
| Other | 7.9 (70) | 7.8 (73) |
| Education | | |
| High school graduate or less | 26.6 (236) | 33.5 (309) |
| Associate/technical degree/certification | 28.4 (252) | 26.0 (240) |
| Bachelor degree or higher | 45.1 (400) | 40.4 (372) |
| Income | | |
| Low ($0–$49,999) | 45.5 (397) | 42.1 (384) |
| Middle ($50,000–$99,999) | 35.4 (309) | 39.4 (360) |
| High ($100,000+) | 19.2 (167) | 18.5 (169) |
| Intuitive eating, weighted quartiles | | |
| Least intuitive | 25.3 (226) | 26.3 (246) |
| Less intuitive | 17.2 (154) | 18.1 (70) |
| Somewhat intuitive | 31.4 (281) | 30.6 (286) |
| Most intuitive | 26.1 (233) | 25.0 (234) |

EAT-IV indicates Eating and Activity in Teens and Young Adults.

**Table 2.**

Weighted Adjusted Mean Daily Dietary Intake Shown by Intuitive Eating Quartiles at EAT-IV Among Women (n = 878)[a]

| | Intuitive Eating Quartiles | | | | | |
|---|---|---|---|---|---|---|
| **Daily Servings** | **Least Intuitive** | **Less Intuitive** | **Somewhat Intuitive** | **Most Intuitive** | **Linear Trend (SE)** | ***P*** |
| Fruit, 1/2 cup servings | 2.1 ± 0.3 | 1.9 ± 0.3 | 2.5 ± 0.3 | 2.7 ± 0.3 | 0.24 (0.07) | 0.001 |
| Vegetables, 1/2 cup servings | 4.6 ± 0.3 | 4.5 ± 0.3 | 4.9 ± 0.2 | 5.0 ± 0.3 | 0.14 (0.07) | 0.04 |
| Whole grains, 16 g servings | 2.1 ± 0.2 | 2.0 ± 0.2 | 2.2 ± 0.2 | 2.2 ± 0.2 | 0.05 (0.04) | 0.27 |
| Dairy, 1 cup servings | 1.3 ± 0.1 | 1.4 ± 0.1 | 1.4 ± 0.1 | 1.4 ± 0.1 | 0.02 (0.03) | 0.56 |
| Protein, g | 86.8 ± 2.6 | 83.9 ± 2.8 | 83.5 ± 2.5 | 83.3 ± 2.7 | −1.16 (0.69) | 0.09 |
| Sugar-sweetened beverages, servings | 0.3 ± 0.1 | 0.4 ± 0.1 | 0.3 ± 0.1 | 0.2 ± 0.1 | −0.02 (0.02) | 0.46 |
| Total kilocalories[b] | 2,070 ± 96 | 1,939 ± 104 | 1,866 ± 92 | 2,124 ± 100 | −0.61 (25.91) | 0.98 |
| Total fat, g | 70.9 ± 1.6 | 71.9 ± 1.7 | 68.7 ± 1.5 | 69.9 ± 1.6 | −0.62 (0.42) | 0.14 |
| Saturated fat, g | 22.0 ± 0.7 | 22.7 ± 0.8 | 21.1 ± 0.7 | 21.4 ± 0.7 | −0.36 (0.19) | 0.06 |

EAT-IV indicates Eating and Activity in Teens and Young Adults.

[a]Adjusted for income, education, ethnicity/race, and total caloric intake. n = 877 for sugar-sweetened beverages;

[b]Adjusted for income, education, and ethnicity/race.

**Table 3.**

Weighted Adjusted[a] Mean Daily Dietary Intake Shown by Intuitive Eating Quartiles at EAT-IV Among Men (n = 687)

| | Intuitive Eating Quartiles | | | | | |
|---|---|---|---|---|---|---|
| **Daily Servings** | **Least Intuitive** | **Less Intuitive** | **Somewhat Intuitive** | **Most Intuitive** | **Linear Trend (SE)** | ***P*** |
| Fruit, 1/2 cup servings | 1.5 ± 0.2 | 1.6 ± 0.2 | 1.7 ± 0.1 | 1.8 ± 0.1 | 0.10 (0.05) | 0.03 |
| Vegetables, 1/2 cup servings | 2.6 ± 0.2 | 2.7 ± 0.3 | 2.7 ± 0.2 | 3.2 ± 0.2 | 0.18 (0.07) | 0.01 |
| Whole grains, 16 g servings | 2.2 ± 0.2 | 2.1 ± 0.2 | 1.9 ± 0.2 | 1.6 ± 0.2 | −0.22 (0.06) | <0.001 |
| Dairy, 1 cup servings | 1.6 ± 0.1 | 1.5 ± 0.2 | 1.7 ± 0.1 | 1.5 ± 0.1 | −0.01 (0.04) | 0.85 |
| Protein, g | 87.2 ± 2.4 | 89.5 ± 2.6 | 85.2 ± 2.4 | 89.5 ± 2.3 | 0.26 (0.74) | 0.73 |
| Sugar-sweetened beverages, servings | 0.6 ± 0.1 | 0.5 ± 0.1 | 0.6 ± 0.1 | 0.7 ± 0.1 | 0.04 (0.04) | 0.24 |
| Total kilocalories[b] | 2,169 ± 102 | 2,023 ± 109 | 2,171 ± 99 | 2,145 ± 97 | 4.43 (30.72) | 0.89 |
| Total fat, g | 76.6 ± 1.8 | 79.1 ± 1.9 | 76.3 ± 1.7 | 77.3 ± 1.7 | −0.01 (0.53) | 0.99 |
| Saturated fat, g | 26.4 ± 0.7 | 27.4 ± 0.7 | 26.1 ± 0.7 | 26.7 ± 0.7 | −0.01 (0.21) | 0.95 |

EAT-IV indicates Eating and Activity in Teens and Young Adults.

[a]Adjusted for income, education, ethnicity/race, and total caloric intake;

[b]Adjusted for income, education, and ethnicity/race.