

Smart Food Consumption Study

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Introduction

Educating adolescents about healthy eating is essential for developing informed lifestyle choices, as many lack the skills to apply nutrition knowledge, particularly in reading labels and understanding nutrient content (Azevedo Perry et al., 2017). National surveys highlight poor dietary habits, such as low fruit and vegetable intake, which are linked to chronic disease and poor mental health (CDC, 2023), with social media exposure further encouraging unhealthy behaviors (Fulkerson et al., 2022). The Dietary Guidelines for Americans reported only a 51/100 adherence score among teens ages 14–18, likely worsened by increased screen time during COVID-19 (Dietary Guidelines Advisory Committee, 2020). Addressing these challenges, the REEU Smart Food Consumption Program used USDA resources such as MyPlate (USDA, n.d.) and the Thrifty Food Plan (USDA, 2021) to teach budgeting, meal preparation, and food safety. Findings align with Chen's (2019) study showing that what families purchase, rather than where they shop, drives healthier outcomes. By combining education with interactive activities, the workshop improved participants' nutrition knowledge, budgeting skills, and food security, underscoring the importance of comprehensive, age-appropriate nutrition education (PolicyLab, 2022; CDC, n.d.-a).

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Purpose and Objectives

The purpose of our study was to track the behavioral changes of the participating teenage and adolescent students as they go through lessons, field trips, and activities related to nutrition, food security, food safety, food waste management, and food shopping during a summer workshop. Field trips and activities were used to reinforce ideas learned in formal lessons. This study aimed to evaluate the impact of interactive nutrition education and guided shopping activities on adolescents' dietary habits, food safety practices, and budgeting skills. By comparing pre- and post-workshop surveys and shopping cart analyses, the study sought to measure behavioral changes toward healthier and more cost-effective food choices.

Method

This 8-week summer study (June 13–July 18, 2025) combined lectures, hands-on activities, and field trips to reinforce nutrition concepts for 21 adolescent participants. Sessions included an initial Walmart trip to assess baseline shopping habits with a \$50 budget, a visit to Sustain Huntsville to learn about community gardening and meal planning with USDA's MyPlate and Thrifty Food Plan, and lessons on food safety and waste supported by a visit to the SHSU Food Pantry. Students also explored food security at the Sam Houston State University (SHSU) Teaching Kitchen by preparing quick recipes, engaging in budgeting activities with their parents, and concluding with a final grocery shopping trip to measure changes in purchasing behavior. Interactive tools such as Mentimeter were used to capture real-time understanding, and participants completed pre- and post-surveys (results shown in Tables 1 and 2) assessing food habits, safety, budgeting, and physical activity. Quantitative data from the pre- and post-workshop surveys were analyzed using descriptive statistics to assess changes in participants' dietary behaviors, food safety practices, budgeting skills, and physical activity levels. Mean scores, standard deviations, minimums, and maximums were calculated for each survey variable using Microsoft Excel. Paired comparisons of pre- and post-intervention means were used to identify trends in improved outcomes, such as increases in fruit and vegetable intake, meal planning, and food safety behaviors. Changes in shopping behavior were examined through analysis of individual shopping receipts and categorized into food groups based on the USDA MyPlate framework (grains, vegetables, fruits, protein, and dairy). The percentage of total cost allocated to each category was compared before and after the intervention to evaluate shifts toward healthier purchasing patterns. Qualitative observations from field trip discussions and participant reflections were also reviewed to provide contextual support for the quantitative findings.

Table 1

Pre-Workshop Survey Results:

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	Min	Max
Age	21	13.71	1.35	11	17
BMI	21	25.54	5.38	16.42	35.98
Female	21	0.62	0.50	16.42	35.98
1.Fruit	21	2	1.26	20.57	36.31
2.Vegetable	21	1.62	1.02	0	4
3.Sugar Drink	21	1.19	1.03	0	4

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	Min	Max
4.Whole Grain	21	1.86	1.15	0	4
5.Healthy Choice	21	1.62	1.07	0	4
6.Nutrition Label	21	1.57	1.43	0	4
7.Active Day	21	4.62	2.01	0	4
8.Vigorous Day	21	3.67	2.39	1	7
9.Screen Time	21	2.81	1.17	0	7
10.Wash Hand	21	2.90	1.30	1	4
11.Wash FV	21	2.90	1.30	0	4
12.Cutting Board	21	2.612	1.32	0	4
13.Fridge	21	3.19	1.12	0	4
14.Compare Price	21	2.71	1.15	0	4
15.Check Sale	21	2.14	1.24	0	4
16.Make Meal	21	2.62	0.80	0	4
17.Plan Meal	21	2.24	1.45	1	4
18.Make list	21	2.62	1.28	0	4

Table 2

Post-Workshop Survey Results:

Variables	<i>n</i>	<i>M</i>	<i>SD</i>	Min	Max
Age	21	13.71	1.35	11	17
BMI	13	26.35	5.13	20.57	36.31
Female	13	0.77	0.83	0	0
1.Fruit	13	2.46	1.27	0	4
2.Vegetable	13	2.31	1.38	0	4
3.Sugar Drink	13	2.23	1.24	0	4
4.Whole Grain	13	5.46	2.57	0	7
5.Healthy Choice	13	4.62	2.57	0	7
6.Nutrition Label	13	2.77	1.36	1	4
7.Active Day	13	3.54	0.78	2	4
8.Vigorous Day	13	3.46	0.78	2	4
9.Screen Time	13	3.62	0.96	1	4
10.Wash Hand	13	3.62	0.65	2	4
11.Wash FV	13	3.00	0.91	1	4
12.Cutting Board	13	2.69	1.03	0	4
13.Fridge	13	2.31	1.18	1	4
14.Compare Price	13	2.46	0.78	1	4
15.Check Sale	13	2.69	0.95	1	4
16.Make Meal	13	4.38	0.65	3	5
17.Plan Meal	13	4.31	0.95	2	5
18.Make list	13	4.31	0.75	3	5

Variables	<i>n</i>	<i>M</i>	<i>SD</i>	Min	Max
Nutrition Session	13	4.54	0.66	3	5
Healthy Eating Session	13	4.31	0.85	3	5
Food Safety and Food Waste Session	13	4.31	0.75	3	5
Food Security Session	13	4.46	0.66	3	5
Gardening Session	13	4.38	0.96	2	5
Organic Session	13	4.77	0.60	3	5
Shopping Session	13	4.46	0.66	3	5
Meal Planning Session	13	4.15	1.21	1	5
Walmart	13	4.54	1.20	1	5
Farm	13	4.46	0.66	3	5
Pantry	13	4.15	1.21	1	5
Kitchen	13	4.54	1.20	1	5

Results

The pre/post survey results showed notable improvements, with the largest gains in whole grain choices (+193%), healthy food choices when eating out (+185%), meal planning (+92%), and grocery list use (+65%). Additional increases were seen in vegetable intake, fruit intake, handwashing, and checking for sales. Analysis of shopping cart data revealed a 43% decrease in miscellaneous items, while vegetables, fruits, grains, protein, and dairy either increased or remained stable, showing a marked shift toward healthier patterns. These findings demonstrate that participants' dietary behaviors and consumer choices moved significantly closer to the American Dietary Guidelines following the workshop.

Figure 1

Pre-Workshop Cost Share Student 1:

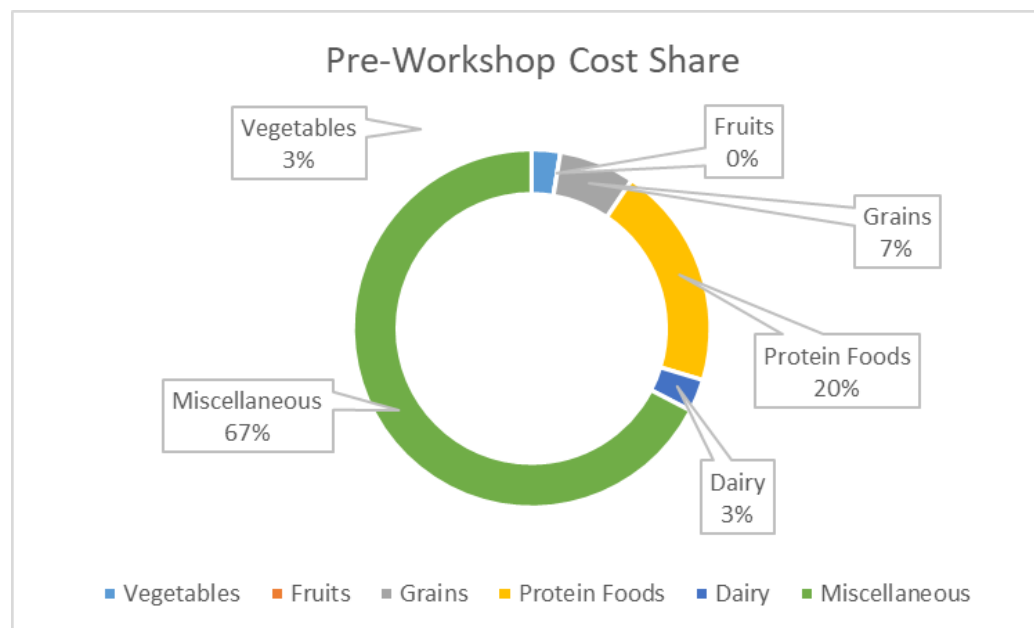


Figure 2

Post-Workshop Cost Share Student 1:

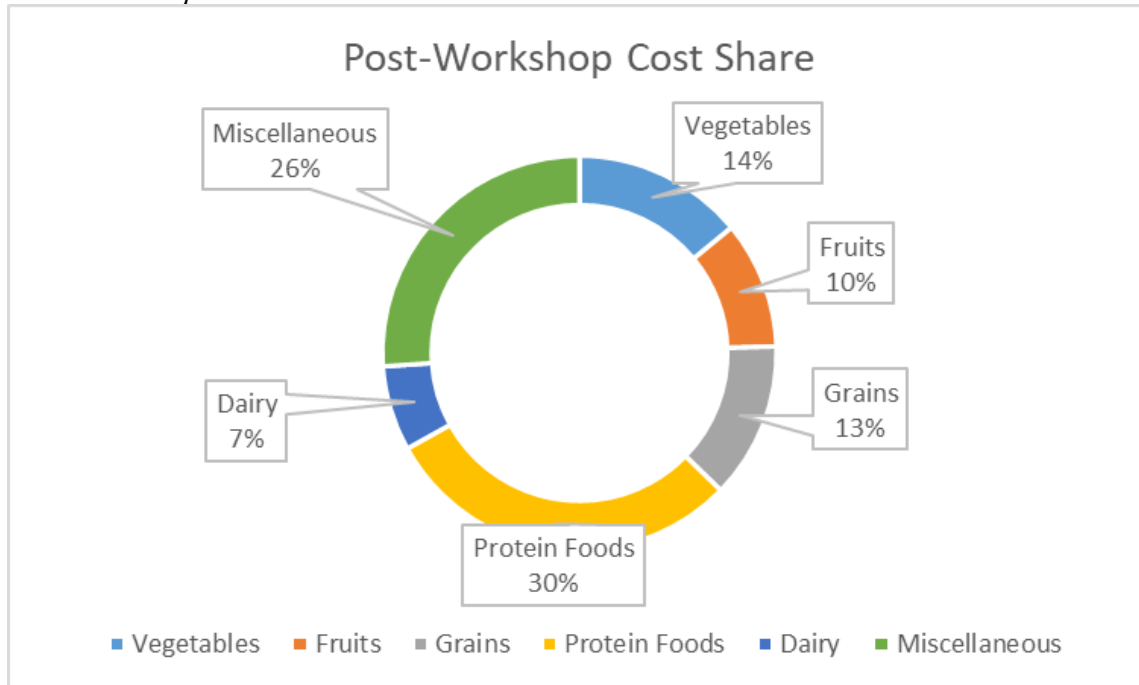


Figure 3

Pre-Workshop Cost Share Student 2:

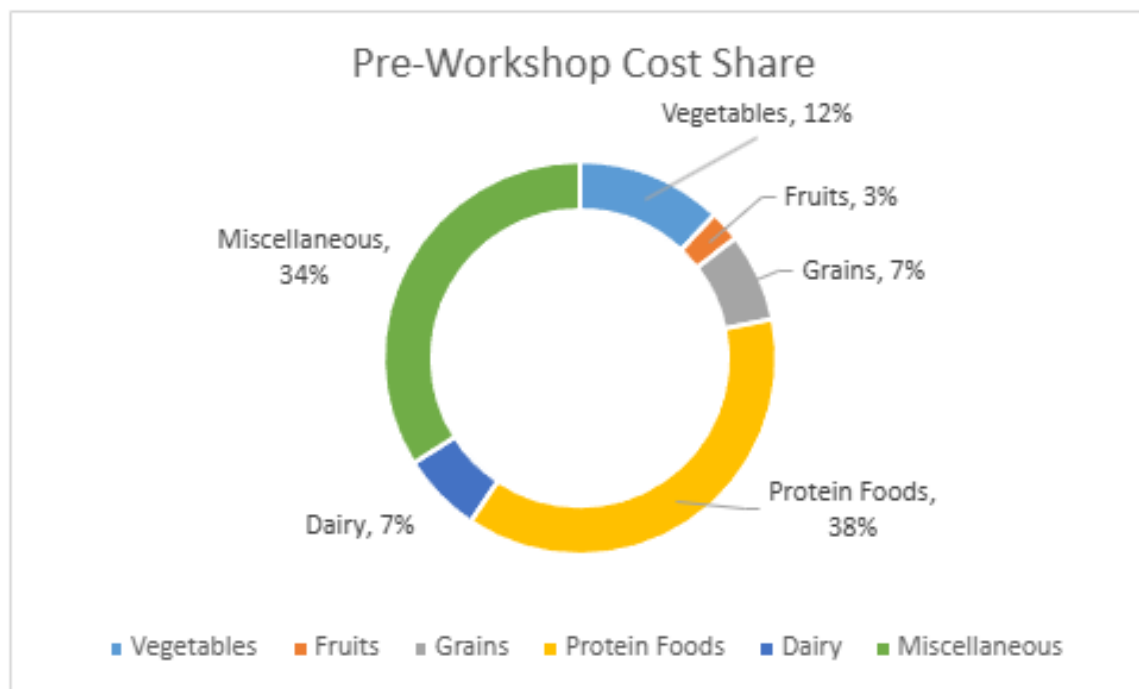


Figure 4

Post-Workshop Cost Share Student 2:

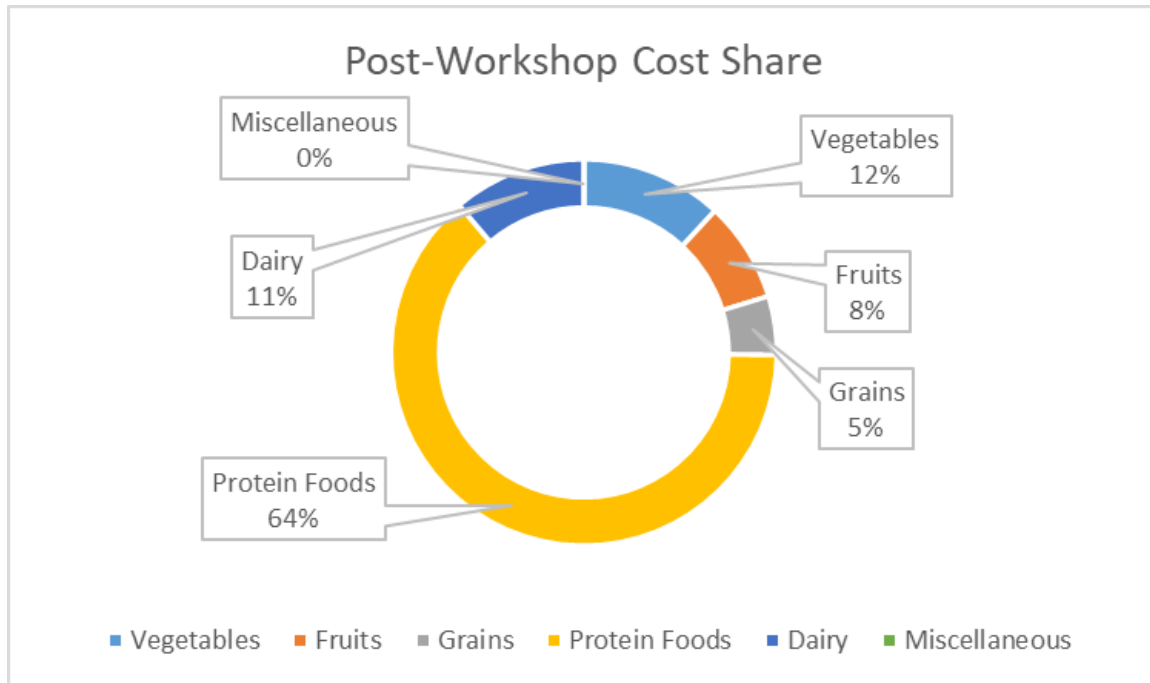


Figure 5

Pre-Workshop Cost Share Student 3:

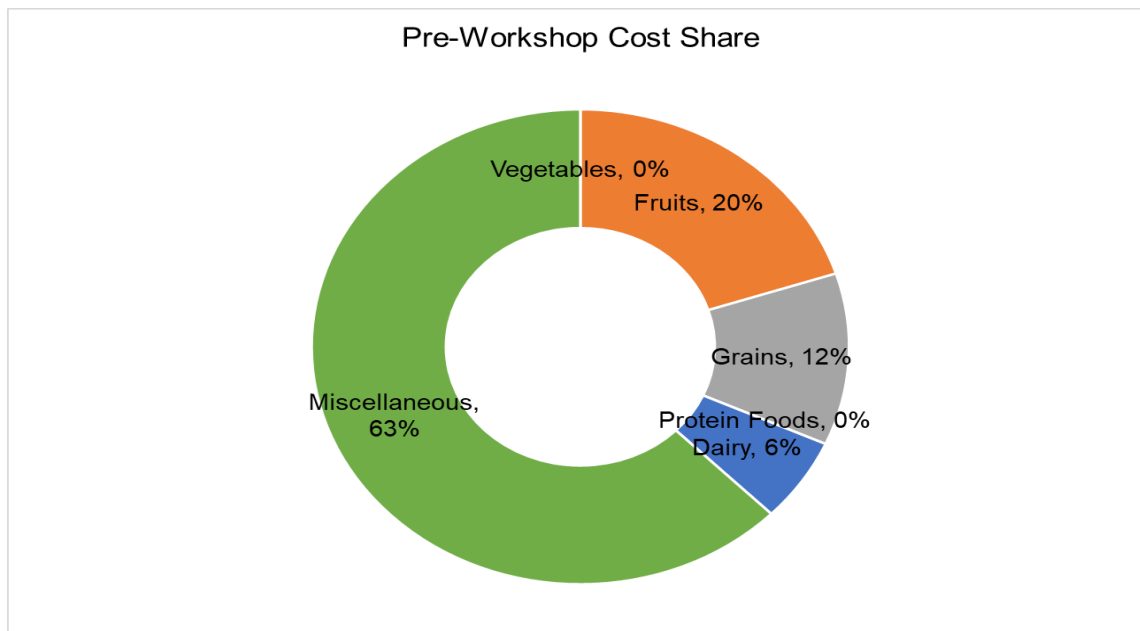
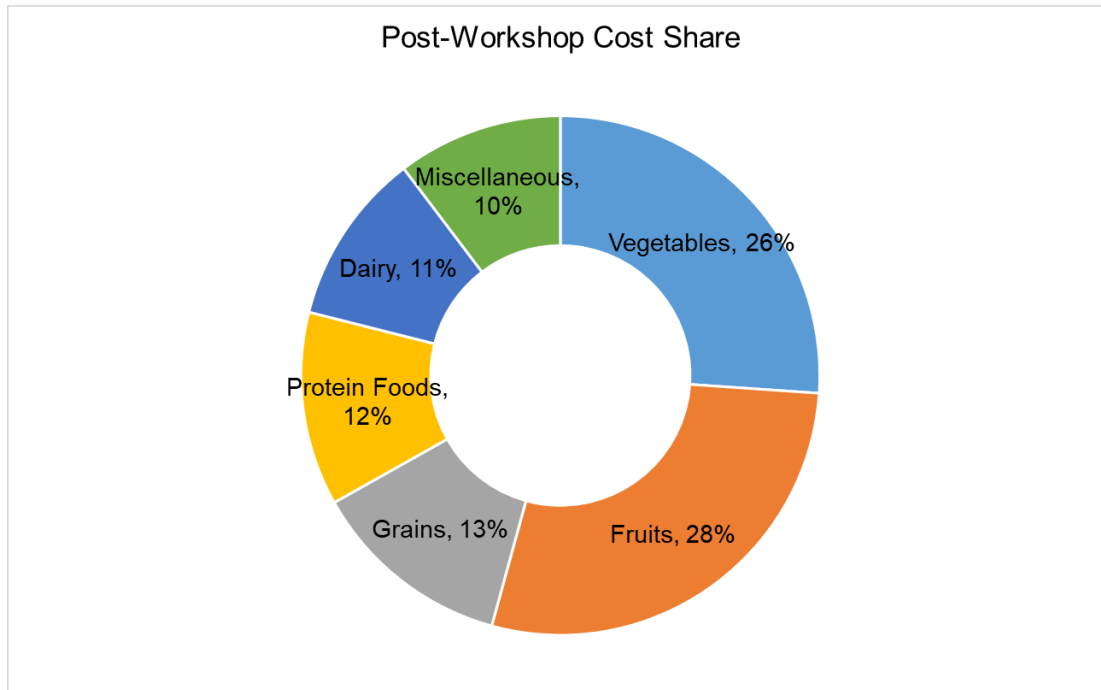


Figure 6

Post-Workshop Cost Share Student 3:



Conclusions

The Smart Food Consumption summer workshop revealed that interactive, age-appropriate nutrition education can increase adolescents' awareness and decision-making for healthier food and lifestyle choices. Through pre- and post-surveys, hands-on activities, and guided shopping trips, participants increased their understanding of budgeting, nutrition labels, and the importance of balanced diets. The USDA resources, particularly the MyPlate Plan and the Thrifty Food Plan, proved to be effective tools in helping students recognize how to make healthier choices within realistic budgetary limits. While limited by sample size and household data access, the study reinforces the value of empirical learning in food and nutrition knowledge. Making teens aware of the benefits of planning and executing practical skills like meal planning and food budgeting may lead to lasting changes in food behaviors and improved health outcomes. These findings suggest that with more implementation of similar programs being conducted in a wider range of participants, further research is needed to develop a comprehensive understanding of this age group.

Recommendations

Future research should expand the sample size to include a more diverse population of adolescents across different socioeconomic and geographic backgrounds to strengthen generalizability. Incorporating parent-focused interventions alongside youth workshops may help reinforce healthy food behaviors at home and sustain long-term change. Longitudinal follow-up beyond the 8 weeks is recommended to evaluate whether improvements in meal planning, shopping behaviors, and dietary intake persist over time. Additionally, integrating biometric health measures (e.g., cholesterol, blood pressure, or hemoglobin A1c) could provide more direct evidence of the health impacts of nutrition education. Finally, exploring the role of technology, such as mobile apps for meal planning or food label scanning, may enhance engagement and extend the program's reach.

References

- Azevedo Perry, E., Thomas, H., Samra, H. R., Edmonstone, S., Davidson, L., Faulkner, A., ... Kirkpatrick, S. I. (2017). Identifying attributes of food literacy: A scoping review. *Public Health Nutrition*, 20(13), 2406–2415. <https://doi.org/10.1017/S1368980017001276>
- Centers for Disease Control and Prevention. (n.d.). *Nutrition education resources for schools*. U.S. Department of Health & Human Services. <https://www.cdc.gov/school-nutrition/education/index.html>
- Centers for Disease Control and Prevention. (2023). *Youth risk behavior survey (YRBS): Data summary and trends report 2011–2021*. https://www.cdc.gov/mmwr/volumes/72/su/su7201a9.htm?s_cid=su7201a9_w
- Chen, D., Jaenicke, E. C., & Volpe, R. J. (2019). The healthfulness of food-at-home expenditures, the local food environment, and childhood obesity. *American Journal of Health Promotion*, 33(3), 412–419. <https://doi.org/10.1177/0890117118782459>
- Dietary Guidelines Advisory Committee. (2020) *Dietary guidelines for Americans, 2020–2025* (9th ed.). U.S. Department of Agriculture and U.S. Department of Health and Human Services. https://www.dietaryguidelines.gov/sites/default/files/2021-03/Dietary_Guidelines_for_Americans-2020-2025.pdf
- Fulkerson, J. A., Friend, S., Horning, M., Flattum, C. F., Draxten, M., Neumark-Sztainer, D., Gurvich, O., Garwick, A., Kubik, M. Y., Story, M., & Berge, J. M. (2022). *Family meals with adolescents: Associations with dietary intake and psychosocial well-being*. *International Journal of Behavioral Nutrition and Physical Activity*, 19(1), 75. <https://pmc.ncbi.nlm.nih.gov/articles/PMC9156385/>
- Healthy People 2030. (n.d.) *Dietary guidelines*. Office of Disease Prevention and Health Promotion. <https://odphp.health.gov/our-work/nutrition-physical-activity/dietary-guidelines>
- MyPlate. (n.d.). *MyPlate.gov*. U.S. Department of Agriculture. <https://www.myplate.gov/>
- PolicyLab at Children's Hospital of Philadelphia. (2022, June 9). *Making nutrition education for teens accurate, comprehensive, and inclusive*. <https://policylab.chop.edu/blog/making-nutrition-education-teens-accurate-comprehensive-and-inclusive>
- USDA. (2021). *Thrifty food plan, 2021*. Food and Nutrition Service U.S. Department of Agriculture. <https://www.fns.usda.gov/cnpp/thrifty-food-plan-2021>
- U.S. Department of Agriculture. (2021). *Thrifty food plan, 2021*. Food and Nutrition Service. <https://www.fns.usda.gov/snap/thriftyfoodplan>

U.S. Department of Agriculture & U.S. Department of Health and Human Services. (2020, December). *Dietary guidelines for Americans, 2020–2025* (9th ed.).
https://www.dietaryguidelines.gov/sites/default/files/2021-03/Dietary_Guidelines_for_Americans-2020-2025.pdf

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