

Cooking Matters for Kids Improves Attitudes and Self-Efficacy Related to Healthy Eating and Cooking

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ABSTRACT

Objective: To assess changes in self-efficacy and attitudes related to healthy eating and cooking in *Cooking Matters for Kids* participants.

Design: Prepost study design.

Setting: *Cooking Matters for Kids* programs offered by 35 organizations.

Participants: Predominantly third- to fifth-grade children participating in *Cooking Matters for Kids* lessons during fiscal years 2012–17 with matched presurvey and postsurveys (n = 18,113).

Intervention(s): *Cooking Matters for Kids* consists of six 2-hour experiential nutrition and cooking education lessons.

Main Outcome Measure(s): Self-efficacy related to healthy eating and cooking and attitudes toward healthy foods assessed through the *Cooking Matters for Kids* Participant Survey.

Analysis: Changes from the presurvey to postsurvey were assessed using mixed models and repeated measures ordered logistic regression accounting for clustering by course. Effect sizes were calculated using Cohen d for repeated measures. A Bonferroni adjustment was used to correct for multiple comparisons ($\alpha = 0.025$).

Results: Both overall and individual self-efficacy and attitude scores improved from presurvey to postsurvey ($P < 0.0001$). The effect sizes were 0.35 for overall self-efficacy score and 0.17 for overall attitude score.

Conclusions and Implications: Participation in *Cooking Matters for Kids* was associated with improvements in self-efficacy and attitudes related to healthy eating and cooking.

Key Words: nutrition education, cooking, child, healthy eating (*J Nutr Educ Behav.* 2021;000:1–8.)

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INTRODUCTION

Children aged 9 to 13 years in the US are not meeting the 2020–2025 Dietary Guidelines for Americans for fruits, vegetables, whole grains, and dairy are exceeding recommenda-

tions for added sugars, saturated fat, and sodium.¹ This is of concern because a variety of chronic health conditions are related to poor diet.¹ Involvement in cooking has been associated with improved dietary quality measures, such as Dietary

Quality Index-International² and Healthy Eating Index scores,³ in children. Thus, programs that include nutrition and cooking education are a promising strategy for improving food preferences, attitudes, self-efficacy, willingness to try new foods, and healthy eating behaviors in children.^{2,3}

A commonly used nutrition and cooking education program in the US is *Cooking Matters*, a campaign from the national nonprofit organization, *Share Our Strength*, which teaches participants from low-income environments how to shop for and prepare healthy, low-cost meals. *Cooking Matters* collaborates with local partners and provides curricula and instructional materials, training, evaluation, and national leadership support. Programs often use volunteer culinary and nutrition instructors to teach the courses. Since its founding in 1993, *Cooking Matters* has reached > 745,000 participants

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through the in-person course and tour programming and 2.3 million connections through digital content (Leigh Ann Hall, MPH, email communication, March 31, 2021). *Cooking Matters* has developed a variety of hands-on nutrition and cooking education curricula, including *Cooking Matters for Kids*, which targets third- to fifth-grade children from homes with low income. *Cooking Matters* courses include six 2-hour lessons held weekly.

Cooking Matters curricula are based on Social Cognitive Theory and use an experiential learning approach. A key construct of Social Cognitive Theory is reciprocal determinism, which proposes that personal, environmental, and behavioral factors interact in a dynamic and ongoing process to influence behavior.⁴ Attitudes and self-efficacy are 2 of the key personal factors *Cooking Matters for Kids* is designed to address,⁵ and these constructs have been associated with healthy eating behaviors.^{6,7}

The *Supplemental Nutrition Assistance Program Education* (SNAP-Ed) is a large federal nutrition education program that promotes evidence-based interventions to help individuals with low income make healthy choices consistent with the Dietary Guidelines for Americans on a limited budget.⁸ *Cooking Matters* is included in the SNAP-Ed Toolkit as an evidence-based intervention⁹ and used by SNAP-Ed implementing agencies and a variety of other organizations across the US. However, the level of evidence for different *Cooking Matters* curricula varies, with limited peer-reviewed research available focusing on *Cooking Matters for Adults* and *Cooking Matters for Families*.^{10–14} Although program evaluation reports suggest *Cooking Matters for Kids* has resulted in positive outcomes for participants, there has not been published, peer-reviewed research on the curriculum.¹⁵

The objective of this study was to assess changes in self-efficacy and attitudes related to healthy eating and cooking in children participating in *Cooking Matters for Kids* during fiscal years 2012–17. It was hypothesized that children who participated in *Cooking Matters for Kids* would report improvements in self-efficacy and attitudes related to healthy eating

and cooking after participation in the program.

METHODS

Study Design and Participants

This study used presurvey and post-survey data from children participating in *Cooking Matters for Kids* courses offered during fiscal years 2012–17. Partner organizations offering *Cooking Matters for Kids* were required to administer a standard presurvey and postsurvey to participants and report this information to *Share Our Strength*. The dataset obtained from *Share Our Strength* included data from courses offered by 35 partner organizations. The dataset was deidentified and did not include names of partner organizations or sites offering the courses; however, examples of types of organizations offering *Cooking Matters* programming include food banks, nonprofit organizations, cooperative extension, SNAP-Ed, and public health departments.¹⁶ Partners may work with existing groups of children, such as those attending afterschool or summer programs, or recruit a group of children specifically for the courses. The number of times and frequency at which the 6-session *Cooking Matters for Kids* series of lessons was offered varied by the partner organization. We use the term course to refer to each time the series of lessons was offered irrespective of the site or partner organization offering it.

The primary target audience of *Cooking Matters for Kids* is third to fifth-grade children from homes with low income; however, each partner developed their own recruitment strategies, so participants may not be limited to that demographic group. Among the 25,192 children in the dataset, 1,035 (4%) completed neither the presurvey nor postsurveys, 3,461 (14%) completed only the presurvey, 547 (2%) completed only the postsurvey, and 20,149 (80%) completed both the presurvey and postsurveys. Only children with complete information on all premeasures and postmeasures were included in the analyses, and those with missing data were excluded. This left an analytical sample of 18,113 children

from 1,808 *Cooking Matters for Kids* courses. This study was reviewed by the Institutional Review Board at the University of North Carolina at Chapel Hill and determined not to constitute human subjects research as defined under federal regulations and therefore not require approval.

Intervention

The *Cooking Matters for Kids* curriculum is based on the Dietary Guidelines for Americans and includes a variety of age-appropriate, interactive activities to teach children about nutrition and cooking. The curriculum consists of six 2-hour lessons that each include a nutrition lesson and cooking activity. [Table 1](#) shows the lessons and learning objectives. The curriculum includes suggested recipes for each lesson. At the end of each lesson, children are given a handout to take home and share with their families about what they learned. Each handout contains an activity in which children select a challenge from 2 possible choices to complete during the next week related to what was covered during the lesson. Parents and caregivers typically do not participate in the actual *Cooking Matters for Kids* lessons. There is a separate curriculum, *Cooking Matters for Families*, designed for both children and their families to participate together. The instructor guide also includes an activity bank with supplemental activities that can be incorporated into lessons. The program is offered at no cost to participants.

Measures

Cooking Matters collects demographic information, including sex, gender, race, ethnicity, and participation in food assistance programs, as well as a presurvey and postsurvey from participants ([Table 2](#)). Parents often complete the form with demographic information, and children complete the presurvey and postsurvey. The surveys are typically administered to children before the first lesson and during the last lesson. The survey used in this study was developed and previously tested by the Colorado State University Department of Food

Table 1. *Cooking Matters for Kids* Lessons and Learning Objectives

Lesson	Learning Objectives
Lesson 1: You're the Chef	Kids will: <ul style="list-style-type: none"> • Discuss the principle of eating from “every food group, every day” • Practice sharing with their families what was learned in class • Practice using knives safely • Practice reading recipes and assembling <i>mis en place</i> in preparation for cooking • Prepare a recipe with foods from at least 3 food groups
Lesson 2: Colorful Fruits & Vegetables	Kids will: <ul style="list-style-type: none"> • Taste and describe unfamiliar fruits and veggies • Discuss the benefits of eating fruits and veggies of many colors • Practice sharing with their families what was learned in class • Prepare a meal using colorful fruits and veggies
Lesson 3: Whole-Grain Goodness	Kids will: <ul style="list-style-type: none"> • Taste and describe whole-grain foods • Practice identifying whole-grain foods by reading label ingredient lists • Practice sharing with their families what was learned in class • Discuss the benefits of eating breakfast everyday • Prepare a breakfast recipe that includes whole grains
Lesson 4: Smart Snackers	Kids will: <ul style="list-style-type: none"> • Practice reading food labels • Taste and describe a variety of healthy beverages • Practice sharing with their families what was learned in class • Prepare simple snacks they can make at home on their own
Lesson 5: Super Shoppers	Kids will: <ul style="list-style-type: none"> • Practice making smart choices at the grocery store • Practice identifying fruits, vegetables, and whole grains when they are out to eat • Practice sharing with their families what was learned in class • Prepare healthier versions of popular fast foods
Lesson 6: Kitchen Heroes	Kids will: <ul style="list-style-type: none"> • Set goals to continue making healthy choices after the course is over • Prepare healthier versions of celebration foods • Celebrate their success in preparing healthy meals and snacks throughout the course

Science and Human Nutrition. A brief discussion of the development and testing of the survey instrument is included as it is relevant to the present study. The survey includes 8 items related to self-efficacy for healthy eating and cooking behaviors and 5 items related to attitudes toward healthy foods (Table 3). The *Cooking Matters for Kids* logic model that included the behavioral determinants to be targeted in the intervention informed the questions included in the survey.⁵ A 5-person expert panel reviewed the survey, and minor revisions were made to question wording on the basis of feedback.⁵ Cognitive interviews were conducted with 27 children aged 8–12 years from an afterschool program and summer nutrition program.⁵ Most children were able to

accurately describe what each question meant and easily answer the survey questions; however, minor revisions were made to some questions to provide additional clarifications, such as adding examples of whole grains.⁵ Test-retest reliability was assessed with 39 children aged 8–12 years from 4 summer nutrition program sites 10–14 days apart.⁵ The Pearson correlation coefficients ranged from 0.40 to 0.89 for the self-efficacy questions and 0.43 to 0.86 for attitude questions.⁵

Overall self-efficacy and attitude scores were created using a scoring system similar to that used by Cunningham-Sabo and colleagues.¹⁷ Response options and scoring for the self-efficacy questions (1–5 scale) were as follows: “YES! Definitely!!!” (5); “Yes, I think I can do it.” (4); “Not sure/I

don't know what that is.” (3); “No, I don't think I could do it.” (2); and “NO! No way!!!” (1). An overall self-efficacy score was calculated by adding the scores for responses to the individual questions. Possible scores ranged from 8 to 40, with higher scores indicating greater self-efficacy. Response options and scoring for the attitude questions (1–5 scale) were as follows: “really like” (5), “kind of like” (4), “not sure” (3), “don't like” (2), and “really don't like” (1). An overall attitude score was calculated by adding up responses to individual questions. Possible scores ranged from 5 to 25, with higher scores indicating more positive attitudes. The primary outcomes were changes in the mean overall self-efficacy and attitudes scores, and responses to individual survey items were also analyzed.

Statistical Analysis

Mixed models that accounted for clustering by course were used with overall attitude and self-efficacy scores as the dependent variables and time (pre/post) as the independent variable. Means and standard deviations for the individual survey items on the presurvey and postsurvey were also calculated. Statistical significance was assessed using repeated measures ordered logistic regression that accounted for clustering by course, with the dependent variable being question response and the independent variable being time (pre/post) as question responses were ordinal variables. A Bonferroni adjustment was used to correct multiple comparisons for the 2 primary outcomes and $\alpha = 0.025$ (ie, 0.05/2). Effect sizes (d_z) for overall self-efficacy and attitude scores were calculated using the equation shown below in which μ_{x-y} refers to the population mean of the difference, σ_x and σ_y the SD at each timepoint, and ρ the correlation between the 2 time points:¹⁸

$$d_z = \frac{|\mu_{x-y}|}{\sqrt{\sigma_x^2 + \sigma_y^2 - 2\rho\sigma_x\sigma_y}}$$

Effect sizes were considered small $d = 0.2$, medium $d = 0.5$, and large $d = 0.8$.¹⁹ The proportion of children improving on each outcome was also calculated. Effect sizes were calculated using G*Power (version 3.1.9.6, Heinrich Heine University Düsseldorf, Düsseldorf and Germany, 2020), and the remaining statistical analyses were conducted using SAS (version 9.4, SAS Institute Inc and Cary, NC, 2013).

After completing the initial analyses and observing high baseline scores for the majority of participants, subgroup analysis for students starting with lower levels of self-efficacy and attitudes was conducted using the methods previously described. Scores of 4 or 5 for each item indicate having some self-efficacy or positive attitude toward the corresponding behavior. An overall score of 32 or 20 indicates an average score of 4 on each self-efficacy or attitude question, respectively, so

participants with baseline scores < 32 for overall self-efficacy and < 20 for overall attitude were included in the subgroup analyses.

RESULTS

Table 2 shows demographic information for children participating in *Cooking Matters for Kids* and those included in the analytical samples. The sample was predominately female (56.7%), non-Hispanic (61.4%), and White (37.7%) or African American (36.6%). The children varied in age, with most being aged 8–11 years. Among children completing the presurvey, there were no significant differences in baseline scores among those included and excluded from the analyses (data not shown).

Table 3 shows changes in self-efficacy and attitudes toward healthy eating and cooking for all participants from presurvey to postsurvey. The majority of children demonstrated improvements in self-efficacy scores. The mean overall self-efficacy score increased from 34.4 to 36.2 ($P < 0.0001$). Cohen d for repeated measures was 0.35. Significant improvements in the mean scores for each of the individual self-efficacy items were also found ($P < 0.0001$), with 21.4% to 34.5% of children improving on each item. Forty-four percent of the children improved their attitudes toward healthy eating, with a modest increase in the mean overall attitude score from 21.6 to 22.1 ($P < 0.0001$). Cohen d for repeated measures was 0.17. Children showed significant improvements on each attitude item ($P < 0.0001$), with 8.3% to 26.7% of children improving on each item.

In the subgroup analyses for children with lower baseline self-efficacy scores (< 32, $n = 4,386$), 81.4% improved their overall self-efficacy, with an increase in mean overall score from 26.4 (SD, 4.65) to 32.6 (SD, 6.00) ($P < 0.0001$). The mean overall attitude score for children with baseline scores < 20 ($n = 3,887$) increased from 16.7 (SD, 2.59) to 19.5 (SD, 3.74) ($P < 0.0001$), with 73.7% of children having an increased score. Cohen d for repeated measures was 0.93 for overall

self-efficacy and 0.74 for overall attitude score.

DISCUSSION

This study found that children participating in *Cooking Matters for Kids* improved attitudes toward healthy foods and self-efficacy for healthy eating and cooking from presurvey to postsurvey. Effect sizes found in the main analyses were somewhat small (0.35 for self-efficacy and 0.17 for attitudes), limiting the practical significance (ie, the practical importance of the effect) of the findings. This was due in part to the high levels of self-efficacy and attitudes reported at baseline.

The results of the subgroup analyses did show the practical significance for children starting with less than desirable baseline scores. There was a large effect size for overall self-efficacy, with > 80% of children improving. The mean overall self-efficacy score increased to 32.6 after the program, which indicates an average score of around 4 (indicating at least some self-efficacy) for each self-efficacy item. The effect size for overall attitudes was on the higher-end of medium effect size, with nearly three-quarters of children improving their score. The mean overall attitude score increased to 19.5 after the program, which indicates an average score of close to 4 (indicating positive attitudes) for most individual attitude items.

As with this study, a randomized control trial of *Cooking with Kids*, an experiential nutrition education program involving cooking and taste-testing lessons, increased cooking self-efficacy and attitudes among fourth-grade students.¹⁷ An evaluation of *Common Threads*, a 10-week experiential nutrition and cooking education program, found significant improvements in cooking self-efficacy in third- to eighth-grade children.²⁰ An evaluation of the *Cookshop Program* found improvements in cooking self-efficacy, but not attitudes, in fourth- to sixth-grade children after participation in experiential cooking activities.²¹ A randomized control trial of *LA Sprouts* did not find significant improvements in self-efficacy related to

Table 2. Characteristics of Children Participating in *Cooking Matters for Kids*

Characteristics	All Participants (N = 25,192)	Overall Analytical Sample (n = 18,113)	Self-Efficacy Subsample (n = 4,386)	Attitude Subsample (n = 3,887)
Sex ^a				
Male	39.5	38.7	46.6	43.7
Female	55.1	56.7	48.7	51.8
Not reported	5.4	4.5	4.6	4.6
Age, y ^a				
≤ 7	11.7	11.5	17.6	13.8
8	16.8	16.6	18.6	15.8
9	20.3	20.8	18.5	18.5
10	21.4	22.0	18.8	21.4
11	13.7	14.0	11.9	14.2
12	5.6	5.7	5.6	6.5
≥ 13	3.4	3.3	3.3	3.9
Not reported	7.2	6.0	5.7	5.9
Hispanic or Latino ^a				
Yes	28.1	28.8	28.6	25.9
No	60.5	61.4	62.2	64.5
Not reported	11.4	9.9	9.2	9.6
Race ^b				
White ^a	36.2	37.7	36.0	38.8
Black or African American	37.2	36.6	37.9	38.3
Asian	2.8	3.0	3.9	3.3
Native Hawaiian or Pacific Islander	0.8	0.8	0.8	0.9
American Indian or Alaska Native	2.4	2.4	2.7	2.7
Other	16.8	17.2	16.4	14.7
Not reported ^a	12.1	10.7	10.1	10.0
Household program participation ^b				
WIC	9.1	9.2	9.7	9.1
SNAP	18.8	19.2	20.4	20.2
Free or reduced-price school ^a breakfast	31.0	32.0	33.5	31.2
Free or reduced-price school lunch ^a	36.9	38.2	39.9	38.0
Free or reduced-price school supper	6.0	6.2	5.4	5.4
Free summer meals	11.0	11.2	11.9	11.5
Head Start	3.5	3.7	4.2	4.2
Food pantry	5.5	5.5	5.5	5.8
Do not participate in any programs listed above	25.1	26.2	24.9	27.0
Not reported ^a	26.1	23.8	23.1	23.2

WIC indicates *Special Supplemental Nutrition Program for Women, Infants, and Children*; SNAP, *Supplemental Nutrition Assistance Program*.

^a $P < 0.0025$ when comparing all participants to the overall analytical sample using Roa-Scott chi-square tests, which are tests of association that accounted for clustering by course. For sex, age, and Hispanic or Latino, 1 Roa-Scott chi-square test was performed for each variable that included all response options. For questions in which participants could select > 1 option (race and household program participation), each response option was coded as 1/0 and assessed in a separate Roa-Scott chi-square test. A Bonferroni adjustment was used to correct for multiple comparisons, and $\alpha = 0.0025$ (ie, 0.05/20); ^bIndividuals were asked to mark all that apply on the question asking for this information.

Note: Values are displayed as %.

Table 3. Changes in Self-Efficacy and Attitudes Toward Healthy Eating and Cooking from Before to After Participation in *Cooking Matters for Kids*

Changes	Children Improving			Children Improving		
	Before	After	Children Improving	Before	After	Children Improving
Self-Efficacy	Overall Sample (n = 18,113)			Self-Efficacy Subgroup (n = 4,386)		
Overall self-efficacy score	34.4 (5.56)	36.2 ^a (4.73)	55.7	26.4 (4.65)	32.6 ^a (6.00)	81.4
I can make something to eat with fruit all by myself	4.4 (1.02)	4.7 ^a (0.75)	29.8	3.5 (1.37)	4.4 ^a (1.07)	52.4
I can make something with vegetables all by myself	4.0 (1.29)	4.4 ^a (1.09)	34.5	2.8 (1.43)	3.8 ^a (1.39)	56.4
I can make healthy choices when I'm out to eat	4.2 (1.19)	4.4 ^a (1.08)	25.7	3.2 (1.47)	3.9 ^a (1.35)	49.0
I can make healthy choices at the grocery store	4.3 (1.11)	4.5 ^a (1.00)	24.3	3.3 (1.44)	4.0 ^a (1.31)	48.4
I can talk to my family about healthy eating	4.3 (1.14)	4.4 ^a (1.06)	23.3	3.2 (1.47)	3.9 ^a (1.37)	48.1
I can talk to my family about healthy cooking	4.3 (1.12)	4.5 ^a (0.99)	24.6	3.2 (1.43)	4.0 ^a (1.32)	50.1
I can follow recipe directions	4.5 (1.02)	4.7 ^a (0.80)	22.0	3.6 (1.45)	4.4 ^a (1.10)	45.5
I can use a knife safely	4.4 (1.11)	4.7 ^a (0.79)	21.4	3.6 (1.56)	4.4 ^a (1.13)	43.9
Attitudes	Overall Sample (n = 18,113)			Attitude Subgroup (n = 3,887)		
Overall attitude score	21.6 (3.21)	22.1 ^a (3.06)	43.7	16.7 (2.59)	19.5 ^a (3.74)	73.7
How do you feel about trying new foods?	4.3 (0.98)	4.4 ^a (0.93)	20.8	3.4 (1.32)	3.8 ^a (1.24)	41.8
How do you feel about eating fruit?	4.8 (0.56)	4.9 ^a (0.49)	8.3	4.4 (0.99)	4.7 ^a (0.79)	23.4
How do you feel about eating vegetables?	4.0 (1.21)	4.1 ^a (1.15)	24.2	2.6 (1.34)	3.4 ^a (1.42)	47.8
How do you feel about eating whole-grain foods, such as whole wheat bread, tortillas, or whole-grain crackers?	4.2 (1.09)	4.4 ^a (0.96)	26.7	3.1 (1.35)	3.9 ^a (1.26)	51.3
How do you feel about choosing drinks low in sugar (such as plain, low-fat milk, and water)?	4.2 (1.11)	4.3 ^a (1.07)	23.9	3.1 (1.39)	3.7 ^a (1.33)	46.0

^a $P < 0.001$. P values for changes in overall self-efficacy and attitude scores were calculated using mixed models that accounted for clustering by course with overall attitude and self-efficacy scores as the independent variables and time (pre/post) as the dependent variable. P values for changes in individual survey items were calculated using repeated measures ordered logistic regression accounting for clustering by course, with the dependent variable being question response and the independent variable being time (pre/post).

Note: Values are displayed as mean (SD) or %.

eating fruit and vegetables, cooking and gardening, or attitudes toward cooking and gardening in third- to fifth-grade children after participation in the 12-week nutrition, cooking, and gardening program.²² There was more consistency between our results and past research for self-efficacy; however, it is important to note that the attitude questions in the present study were focused on attitudes toward healthy foods, whereas the previously discussed studies assessed attitudes toward cooking.

Relatively high baseline scores for self-efficacy and attitudes have been found in other experiential nutrition and cooking education programs for children.^{17,20,23} A quasi-experimental evaluation of *Cooking with Kids*,

which found high baseline attitudes and self-efficacy toward cooking, also assessed prior cooking experience.²³ More than 80% of children in their sample had prior cooking experience, and those without prior cooking experience saw the greatest improvement in attitudes and self-efficacy.²³ Data on prior cooking experience was not included in this study; however, 1 possible explanation for the high baseline scores is that a large proportion of children in the sample had prior cooking experience. Cooking frequency has also been associated with self-efficacy for healthy eating and cooking in other studies.²⁴ Engaging in meal preparation activities can increase self-efficacy for selecting healthy foods and cooking,

which can act reciprocally to increase the frequency of engaging in those behaviors.²⁴ This relates to Social Cognitive Theory, which *Cooking Matters for Kids* is based on, and helps explain why it is expected that hands-on cooking activities would lead to improved self-efficacy and attitudes toward cooking and healthy eating. Improvements may be more likely for children starting with less cooking experience and self-efficacy and attitudes toward healthy eating and cooking. Another potential explanation for high baseline scores is social desirability bias. Some children may have reported high self-efficacy and attitudes because they felt that those responses would be viewed more favorably.

The differences in results for the overall sample and subgroup analyses demonstrate the importance of participant's baseline scores in whether or not an intervention program can lead to practically relevant results as children starting with desirable scores for outcomes have little to no room to increase their scores. Information on recruitment strategies used by partner organizations implementing *Cooking Matters for Kids* was not available; however, it is possible that children with interest in healthy eating and/or cooking were more likely to self-select into the program.

To the authors' knowledge, this study included the largest sample of children in an evaluation of an experiential nutrition and cooking education program. A strength of *Cooking Matters for Kids* is that organizations implementing the curriculum use a common survey instrument and submit their data to *Share Our Strength*, which allows for national program evaluation. Although carrying out studies in tightly controlled settings can be beneficial for determining program efficacy, the ability to evaluate the program implemented by 35 different partner organizations allowed for an assessment of the effectiveness of the program under real-world settings.

However, this study is not without limitations. This study only used presurvey and postsurvey data from children participating in the program and did not include a control group. The large sample size may have resulted in small changes showing statistical significance. Although the expectation is that participants will not take the same *Cooking Matters* course more than once, with multiple partners implementing the program, each using different recruitment strategies, it is possible that some children participated more than once. Because of the deidentified nature of the dataset, it is not possible to determine if this occurred. Although the study found improvements in determinants of cooking and healthy eating behaviors, it did not assess actual behavior change, so it is unclear whether participants cooked more and ate healthier after participating in the program. Attitudes and self-efficacy

have been associated with healthy eating behaviors,^{6,7} and other experiential cooking education programs have shown improvements in dietary intake.^{20,21,25} This study also did not assess whether changes were maintained over time.

Another limitation is that approximately 22% of children in the dataset did not complete the presurvey and/or postsurvey, and an additional 7% were excluded for missing data which could lead to bias. Although missing survey data could indicate a child dropped out of the program, there are other plausible reasons for missing data, such as being absent or arriving late or early the day surveys were administered. The proportion of children with matched surveys in our sample is similar to an evaluation of *Cooking with Kids*,²³ and higher than an evaluation of *Common Threads*, which did not have matched surveys for > 41% of students applying to participate in the program.²⁰

IMPLICATIONS FOR RESEARCH AND PRACTICE

Research and evaluation on *Cooking Matters* curricula are important as they are widely used by organizations across the US. Considerations for future research on *Cooking Matters for Kids* include using a control group with an assessment of changes in dietary and cooking behaviors and long-term changes in outcomes.

The results of the current study found that children participating in *Cooking Matters for Kids* demonstrated statistically significant increases in self-efficacy and attitudes related to healthy eating and cooking after program participation. Although the results were practically significant (ie, the size of the change was large enough to be meaningful) for children starting with lower baseline levels of self-efficacy and attitudes, the majority of children in the sample began with high baseline scores, which limits the overall practical significance of these findings. If nutrition and cooking education programs are going to lead to population-level improvements in healthy eating and cooking behaviors, the

programs must reach those children in most need of the programs.

Participation in these programs is often based on self-selection, either by the participant, parent, and/or organization offering them, which can lead to individuals who already have an interest in nutrition and cooking initially choosing to participate and/or participating for the duration of the program. This is important for both research and practice. When the majority of individuals are already scoring high on an outcome at baseline, there is little room for an intervention to lead to improvements, and only small effect sizes, if any, may be found. Additional research can be done to understand recruitment strategies and participant characteristics and identify strategies for ensuring that children who can benefit most from these programs can participate.

It is helpful for nutrition educators to consider the strategies they use for recruiting and retaining participants in nutrition and cooking education programs so those individuals who can benefit most participate. Offering nutrition and cooking education as part of instructional time during the school day to all children rather than making it an optional program for those who are interested and have the time and ability to get to locations where programs are offered can help to maximize the benefits these types of programs may provide. National requirements for nutrition education in schools could help make nutrition and cooking education programs, such as *Cooking Matters for Kids*, more accessible to the children who could benefit most.

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