

Impact of a School-Based Cooking Curriculum for Fourth-Grade Students on Attitudes and Behaviors Is Influenced by Gender and Prior Cooking Experience

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ABSTRACT

Objective: To compare effects of the *Cooking With Kids* (CWK) cooking and tasting curriculum (CWK-CT) with a less-intense, tasting-only curriculum (CWK-T) and to conduct a non-treatment comparison on fourth graders' cooking self-efficacy (SE), cooking attitudes (AT), and fruit and vegetable preferences (FVP).

Design: Pre-post, quasi-experimental, 2 cohorts.

Setting: Eleven low-income public schools in a Southwestern city.

Participants: Fourth-grade students, 50% female and 84% Hispanic.

Interventions: School-based experiential nutrition education program of 5 2-hour cooking and/or 5 1-hour fruit and vegetable tasting lessons throughout the school year.

Main Outcome Measures: Cooking self-efficacy, AT, and FVP were assessed with 3 tested, validated scales administered in a 37-item survey pre- and post-classroom intervention.

Analysis: General linear modeling with gender and prior cooking experience were fixed factors.

Results: Among 961 students, CWK positively affected FVP, especially in CWK-CT students and males ($P = .045$ and $.033$, respectively); vegetable preference drove this outcome. Independent of treatment, students without cooking experience (61% male) had more than twice the gains in cooking self-efficacy ($P = .004$) and an improved AT response ($P = .003$).

Conclusions and Implications: *Cooking With Kids* increased FVP, especially with vegetables. Greatest gains in preferences and self-efficacy were seen in boys without prior cooking experience. For fourth graders, experiential nutrition education improved cognitive behaviors that may mediate healthful food choices.

Key Words: fruits, vegetables, nutrition survey, nutrition education, child, cooking, food preferences, self-efficacy, attitude (*J Nutr Educ Behav.* 2014;46:110-120.)

INTRODUCTION

For children to eat healthfully, encouraging repeated exposure to a wide variety of foods and engagement of all of their senses is requisite.¹⁻⁴ Involving them in direct cooking experiences continues to appear in recommendations to address obesity^{5,6} and is congruent with addressing the self-efficacy (SE) and attitude constructs that undergird

behavior change theory. Yet, only a few studies have investigated cooking's positive impact on children's dietary consumption and other health outcomes. One of these used a cross-sectional survey of Canadian fifth graders, and revealed that those who reported more frequently helping prepare and cook foods at home had stronger preferences for fruits and vegetables (FVP) and higher SE for selecting and eating healthy

foods.⁷ Another example is the Cookshop program, which was examined using a 2×2 factorial design to compare the effectiveness of 10 vegetable and whole-grain cooking lessons with and without additional (non-cooking) food and environment lessons, against a non-intervention comparison group. Results included (1) significant improvements in targeted food preferences for students in both groups receiving the experiential food lessons compared with those receiving just the food and environment lessons or comparison, (2) increases in cooking SE among older children receiving the cooking lessons, and (3) greater behavioral intentions among younger children receiving the cooking lessons.⁸ Finally, a quasi-experimental, 12-week gardening and cooking curriculum for fourth- and fifth-grade Latino students, LA Sprouts, demonstrated

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<http://dx.doi.org/10.1016/j.jneb.2013.09.007>

increased fiber consumption and decreased blood pressure, and among overweight students, reduced body mass index and slowed weight gain compared with a control group.⁹

Cooking With Kids (CWT) is a school-based food and nutrition education curriculum that has been positively reviewed¹⁰ and successfully adopted by elementary schools, but does not have a research evidence-base. *Cooking With Kids* engages elementary school children in hands-on learning with fresh affordable foods based on diverse cultural traditions. Students are encouraged to explore varieties of healthful foods using all of their senses, acquire practical food preparation skills, have fun working in a cooperative environment, and exercise choice. The bilingual curriculum was developed for a predominantly low-income, Hispanic community in the Southwestern United States, and refined over 12 years. Currently, nearly 5,000 pre-kindergarten through sixth-grade students in 13 district schools participate in this program. *Cooking With Kids* models interdisciplinary learning in math, science, language arts, social studies, music, and art.¹¹

Implementation of the full curriculum includes 16 hours of cooking and tasting lessons (1 introductory class, 5 1-hour fruit and vegetable tastings led by classroom teachers, and 5 2-hour cooking classes led by CWK food educators) throughout the school year. *Cooking With Kids* supports family involvement by inviting parents to volunteer during cooking classes, and sends recipes home with encouragement to students to prepare these dishes with their family. Because of limited resources, some schools just receive the fruit and vegetable tasting lessons. In addition, the program links classroom learning with school meals, because foods prepared in the classroom are served at school lunches several times each month.

The purpose of this study was to examine the effects of the CWK cooking and tasting (CWK-CT) curriculum, against a less resource- and time-intensive, tasting-only (CWK-T) curriculum and a non-treatment comparison condition (comparison), on fourth-grade students' FVP, cooking attitudes (AT), and cooking SE.

METHODS

Study Design, Participants, and Interventions

The pre-post, quasi-experimental study included 2 cohorts of Santa Fe, NM Public School students in fourth-grade classrooms from 2 consecutive school years. Two inclusion criteria were applied to school recruitment and assignment to condition: (1) All schools had to be eligible for participation in the United States Department of Agriculture-funded Supplemental Nutrition Assistance Program Education (ie, $\geq 50\%$ of students qualify for free or reduced-price school meals); and (2) prior CWK participation (or lack of participation) was congruent with assigned treatment. That is, schools receiving CWK-CT had prior exposure to both cooking and tasting lessons, those receiving CWK-T had prior exposure only to tasting lessons, and those with no prior program exposure were assigned to the comparison. All eligible schools who were invited to participate agreed to do so.

Data Collection

Survey development and description.

Three scales combined into a 37-item survey were administered in each participating classroom before and after intervention to assess the impact of the 2 CWK intervention conditions on students' perceived cooking SE (8 items), cooking AT (6 items), and FVP (18 items). Five response options were provided for each scale. Possible scores for the SE scale ranged from 8 to 40, score ranges for the AT scale were 6 to 30, and score ranges for the FVP scale were 18 to 90. Higher scores indicated a more positive response for each scale. Demographic information and pre-study cooking experience (5 items) were also assessed.

Survey items were written in both English and Spanish. Accuracy of Spanish translation was ensured with a valid back translation. A 3.7-grade reading level was determined using the SMOG method. Items were assessed for translational validity (ie, face and content validity) by experts and by members of the target audience using one-on-one cognitive interviews as described previously.¹²

Testing also included assessment of psychometric parameters, and a Cronbach alpha of $\geq .74$ was achieved for all scale administrations.¹² In addition, test-retest reliability was established and with individual test-retest scores significantly ($P < .001$) correlated ($n = 344$; 72.9% Hispanic); $r = 0.80$ (SE), 0.82 (AT), and 0.88 (FVP).¹²

Survey administration. Surveys were administered as a group to each class to all assenting students present on the day of administration. Survey administration followed a protocol that was developed with teacher input and formatively tested. Thus, after the protocol: (1) teachers were present in their classroom but not directly involved in survey administration; (2) verbal encouragement to students was given to complete the survey in their preferred language (Spanish or English); (3) instructions and the top item on each survey page were read aloud by researchers with guidance to students to complete the rest of the page independently; (4) trained researchers completed an observation form to record start and stop time of survey administration, any questions students had completing the survey, and any unusual happenings during survey administration that might influence student responses (eg, fire alarm); and (5) for cohort 2, administrators returned to collect surveys from students absent on the day of post-survey administration. The survey is available as online supplemental data.

Analysis

For each scale, item responses were summed to create a scale score. For all scales, desired outcomes were noted by higher scores. Internal consistency was assessed with Cronbach alpha; scale structure was analyzed using principle components extraction with varimax rotation. For the AT scale, (which had only 6 people missing just 1 scale item), missing data were handled by list-wise deletion and AT scale score was not calculated if any item was missing. Self-efficacy and FV scale scores were not calculated if more than 1 item was missing. If only 1 item was missing, the maximum likelihood estimation method

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