

RESEARCH NOTE

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# Cooking with confidence for autistic youth: outcomes from a pilot program evaluation model

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## Abstract

**Objective** This article outlines the evaluation model for the Cooking with Confidence (CWC) program, developed using Bandura's Social Learning Theory as its conceptual framework. The evaluation aimed to: (1) Examine participant characteristics in the CWC program, (2) Assess changes in cooking knowledge, skill acquisition, self-efficacy, and confidence, and (3) Identify barriers and facilitators to participant engagement. CWC is a community-based educational program designed to help autistic young adults develop independent living skills and promote health through hands-on cooking classes. Recognizing the need for more opportunities for autistic individuals to practice these skills, the program was created through public and private partnerships. A pre-post study design was employed, with participants completing surveys before and after their involvement in the program.

**Results** Participants reported high satisfaction with the program and showed improvements in cooking knowledge and self-efficacy. The analysis also highlighted participant characteristics, as well as key barriers and facilitators to cooking. Overall, the CWC program demonstrated positive outcomes, with findings offering valuable insights for future program development to enhance its impact.

**Keywords** Autism, Autistic youth, Cooking, Culinary, Independent living skills, Program evaluation

## Introduction

The Centers for Disease Control and Prevention (CDC) defines Autism Spectrum Disorder (ASD) as a developmental disability that can cause social, communication, and behavioral challenges [1]. Culinary education has shown promise to enhance peer relationships and team building [2, 3]. Community Kitchens have been found to improve social interactions, social skills, and access to more social support [4]. Existing literature has shown that cooking classes are feasible interventions for improving autonomy, competence, and daily living skills [5–7], which suggests that this intervention modality may be especially useful for individuals on the autism spectrum. This article describes participant characteristics

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and program evaluation outcomes from a community-based culinary intervention program that was developed incorporating strategies to address confidence, accessibility and affordability among autistic individuals participating in the Cooking with Confidence (CWC) program.

As the program was created to increase participants' confidence in cooking skills, the construct of self-efficacy from Bandura's Social Learning Theory [8] was selected as the primary conceptual framework for the intervention. Self-efficacy refers to one's belief and confidence that one can achieve what one sets out to do [9]. In this case, CWC targeted increasing participants' self-efficacy in their cooking skills through the four sources of information described by Bandura [8]. Please see Table 1: Sources of Self Efficacy and CWC Program. Understanding the role that self-efficacy and confidence can play in participants' cooking experiences can inform targeted strategies for future health intervention development.

Program background

The Cooking with Confidence (CWC) Program is a community-based educational program where autistic young adults practice independent living skills, health promotion activities, and participate in social and community engagement through hands-on cooking classes. Program evaluation objectives assessed for (1) changes in knowledge and self-efficacy, (2) participant satisfaction, (3) engagement with community resources (Free Library), and (4) challenges and facilitators to cooking. The CWC Program utilizes city-funded resources and interdisciplinary partnerships [see Additional File 1 for more details]. Within this collaborative team, a program logic model was developed to ground the program into the short, medium, and long-term outcomes, and to highlight resources needed for program replication [see Additional File 2 for more details]. Please refer to the Public Libraries Magazine article [10] for more details on important program development and contextual factors such as staffing (including Instructor's profile), materials, space, and accommodations.

Table 1 Sources of self efficacy and CWC program

Four Sources of Self-Efficacy	Cooking with Confidence (CWC) Program
Mastery of Experiences	Practicing hands-on cooking skills to gain mastery.
Vicarious Experiences	Observing peers in group setting engaging successfully in cooking tasks.
Verbal Persuasion	Receiving supportive verbal persuasion from instructors.
Physical/Emotional Arousal	Experiencing positive physiological and emotional responses from the cooking experience.

Methods

Participants

The program included seven cohorts between April and November 2022. While forty-four individuals completed assessments, a sample size of thirty-nine participants who completed both the pre- and post-class surveys were included in the analysis. Approximately 13% attended the program in previous years, while it was new for the rest of the participants. As teachers knew their students best and could support them if needed, all students were welcomed into the program regardless of the type of support needed.

Procedure

A pre-post design study was performed. There were two types of program delivery. A 4-week series class was offered and (6) 1-week classes were offered. The 4-week series class included the same cohort attending the program once a week for four weeks. The 1-week class had a new cohort attending the program each week. For the 4-week series class, data was collected before the first class (pre-test) and after the last class (post-test). For the weekly classes, data was collected before (pre-test) and after each class (post-test). Classes were two hours long and took place at the Free Library of Philadelphia Culinary Literacy Center, which is the first space of its kind housing a commercial grade kitchen in a public library.

Measures

Measures included participant demographics, cooking self-efficacy, knowledge of cooking terms and techniques, knowledge of cooking hygiene and safety practices, community participation, and program satisfaction. In addition to the pre- and post- surveys, staff observed each session and took notes. Variables were constructed from each survey question. Modifications were made to validated surveys based on the author team's experience with reducing participant burden in fielding self-report measurement tools with participants on the autism spectrum [see Additional file 3 for pre and post-survey measures and modifications made).

Data analysis

A dataset was generated from the spring and fall sessions. Each session had a pre- and a post-survey. The spring pre-survey and fall pre-survey were combined to create one pre-survey dataset, and the spring post-survey and fall post-survey were combined to create one post-survey dataset. The datasets were linked to ensure the same respondents were present in the pre- and post-surveys, and any duplicates were removed if the respondent took both the spring and fall session. A total of 8 responses were removed due to being present at both survey time-points or not taking the post survey. For the questions

**Table 2** Demographic characteristics of participants in the cooking with confidence program

Demographics Characteristics of CWC Participants (n = 39)		
	N	%
Gender <sup>a</sup>		
Female	9	23.1
Male	29	74.4
Race		
Black or African American	22	56.4
White	11	28.2
Other	3	7.7
Prefer not to say	3	7.7
Are you of Spanish, Hispanic, or Latino origin? <sup>a</sup>		
Yes	5	12.8
No	33	84.6
Age		
Average Age (SD)	18.3 (2.1)	
Range	14–21	

<sup>a</sup> Missing data (N = 1)

that were asked in both pre- and post-surveys, the difference in confidence or knowledge was calculated between the surveys by subtracting the pre-survey rates of confidence or knowledge from the post-survey rates of confidence or knowledge. A positive difference represents an increase in confidence or knowledge, and a negative difference represents a decrease in confidence or knowledge. In addition to calculating the percent change in confidence or knowledge, a McNemar's test was used to test if there was a significant difference between the pre- and post- surveys. Counts, percentages, mean, standard deviation, and range were used to show statistics of the responses to demographic questions and questions not asked at both time points. All data analyses were performed using R version 4.3.0.

## Results

### Demographics

The average age of participants was 18.3 years (SD = 2.1) and ranged from 14 to 21. Most (74%) participants were male, 23% were female and approximately 3% did not provide a response about gender. About 56% of participants identified as Black or African American ( $n = 22$ ), 28% as White ( $n = 11$ ), 8% as Other ( $n = 3$ ), and 8% Prefer Not to Say ( $n = 3$ ). About 13% of participants identified as Hispanic or Latino origin ( $n = 5$ ). Please refer to Table 2 Demographic Characteristics of Participants in the Cooking with Confidence Program.

### Cooking self-efficacy and knowledge

Participants showed a significant increase in confidence in following a written recipe (18%) and ability to plan a healthy meal (15%),  $p < .05$ . Participants also showed a slight increase in ability to use basic cooking techniques

**Table 3** Changes in cooking self-efficacy and knowledge

Changes in Cooking Self-Efficacy (n = 39)					
Self-Efficacy Questions	PRE		POST		% change
	n	% confident	n	% confident	
How confident do you feel about your ability to...					
Follow a written recipe	29	74.4	36	92.3	18.0*
Use a knife to cut up vegetables	29	74.4	28	71.8	-2.6
Plan healthy meals	27	69.2	33	84.6	15.4*
Use basic cooking techniques	28	71.8	33	84.6	12.8
Changes in Knowledge (n = 39)					
Knowledge Questions	PRE		POST		% change
	n	% correct	n	% correct	
Water or any liquid is boiling when:	7	18.0	9	23.1	5.1
It is best to prepare all ingredients, gather equipment and organize before you start to cook.	37	94.9	37	94.9	0.0
The best way to clean your hands before cooking is:	22	56.4	28	71.8	15.4*
When should you wash your hands?	12	30.8	21	53.9	23.1**

\* $p < 0.05$ , \*\* $p < 0.01$ 

and a slight decrease in confidence in the ability to use knife skills to cut vegetables, however, neither were a statistically significant difference. This decline can likely be attributed to several factors, which are further expanded on in the Discussion section.

Participants showed a significant increase in knowledge for the items focused on the best way to clean your hands (15% increase),  $p < .05$ , and when to wash your hands (23% increase),  $p < .01$ . Participants showed a slight increase in knowledge focused on boiling water (5%), however it was not statistically significant, potentially due to the large percentage of participants who did not answer this question. While there was no reported change to the question on preparing ingredients, most participants (94.9%) answered this question correctly. Please refer to Table 3: Changes in Cooking Self-Efficacy and Knowledge.

### Facilitators and challenges

Participants reported that (1) Working with a partner (51%), (2) Having the right equipment (15%) and (3) Recipes that require less time and fewer ingredients (10%), would make cooking easier. When asked what would make eating healthy easier for participants, the top choices selected were (1) Access to affordable and healthy

food (41%), (2) A better understanding of nutrition (18%), and (3) Personal and family food preferences (15%). Participants indicated that the most difficult things about cooking were (1) Focusing on multiple steps (28%), (2) the heat/temperature from cooking (23%), and (3) Cutting ingredients (15%) [Additional file 4]. *Community Participation and Program Satisfaction.*

A little over half of participants (51%) reported that they would go to the Free Library branch in the future, over a quarter (26%) reported that they were not sure if they would go, 15% indicated that they would not go in the future, and close to 8% did not answer the question. Despite the likelihood of returning to a library branch in the future, most participants (90%) reported feeling that the instructor did a good job helping them learn, 5% were unsure and 5% did not answer the question [see Additional file 5].

## Discussion

Results from this program evaluation emphasize how the self-efficacy construct of Bandura's Social Learning Theory [8] contributes to cooking as an intervention and aligns with the CWC program outcomes. Mechanisms by which changes in self-efficacy occurred included the opportunity to practice hands-on to gain mastery, vicarious learning with peers through practice and observation, receiving support and encouragement from both peers and instructors, and general program satisfaction. As a result of these facilitators, participants showed an increase in confidence in following a written recipe, ability to plan a nutritious meal, and ability to use basic cooking techniques. Students also identified working with a partner as one of the strongest facilitators to cooking, which further emphasizes the social aspects of this conceptual model.

Cooking is a complex activity for autistic individuals, often requiring executive functioning skills such as working memory, task initiation, planning, and organization. (11–12) One major barrier is managing the multiple steps involved, which can be overwhelming, especially in group settings that may provide support but also distractions. New sensory experiences in unfamiliar environments can further challenge focus and processing.

Confidence in using a knife to cut vegetables was notably low, with cutting vegetables identified as a top challenge. Factors such as fine motor difficulties, limited prior experience, and anxiety around sharp objects may contribute. Strategies to ease these challenges include working with a partner, using pre-cut vegetables, learning proper knife techniques (e.g., forming a claw hand for safety), and utilizing tools like lettuce knives to enhance safety and reduce anxiety.

Access to affordable, healthy food, understanding nutrition, and personal food preferences are key factors

in promoting healthy eating. Operating in an urban setting with high poverty and food insecurity, the program must account for ingredient cost, access, and sustainability. Although the program was offered at no cost, transportation posed challenges, with some classes using it as travel training and others struggling to cover weekly expenses.

Future directions include exploring the intersection of sensory needs and food selectivity, adding nutrition education, and developing a replicable curriculum for schools, universities, or community settings. Given the high healthcare costs of managing complex conditions, this program could be further studied as a scalable health intervention supported by sustainable funding mechanisms.

## Limitations

- This program evaluation is specific to the partners, staff, participants, and space involved. It may not be generalizable to other settings.
- This program evaluation does not have a comparison or control group. It is difficult to attribute the results solely to the intervention.
- It is important to consider whether and how selection bias may have contributed to participants' success.

## Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s13104-025-07105-6>.

Supplementary Material 1

Supplementary Material 2

Supplementary Material 3

Supplementary Material 4

Supplementary Material 5

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## Author contributions

Conceptualization, M.W., C.C., J.D., R.S., N.F., R.H., B.M., L.S.; methodology, L.S., J.D., S.P., N.F., R.H., B.M.; validation, L.S.; software, S.P.; formal analysis, S.P., R.H., N.F., L.S.; resources, M.W., J.D., B.M., L.S.; investigation, C.R.; writing—original draft preparation, M.W., C.C., J.D., R.S., R.H., N.F., B.M., S.P., C.R.; writing—review and editing, M.W., C.C., S.P., C.R., J.D., R.S., B.M., N.F., R.H., C.R., L.S.; visualization, M.W., S.P.; supervision, N.F., R.H., B.M., J.D., L.S.; funding acquisition, L.S., M.W.; project administration, M.W. All authors have read and agreed to the published version of the manuscript.

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matching amount from the Free Library of Philadelphia Foundation. This is a program evaluation of an intervention developed by the authors.

#### Data availability

Data was obtained from participants for program evaluation purposes and can be made available with their permission.

#### Declarations

##### Ethics approval and consent to participate

Ethical review and approval were waived for this study as the proposed activity is not human subjects research as defined by DHHS or FDA Regulations. A Request for Letter of Determination was submitted (Protocol Number 2108008709). As a program evaluation effort, IRB submission and approval is not necessary as the data was used for quality improvement purposes. Patient consent was waived as data was collected for program evaluation purposes, reported in aggregate form, with no identifying information. Participants were informed that survey data would be used for program evaluation purposes.

##### Consent for publication

Not applicable.

##### Competing interests

The authors declare no competing interests.

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