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## Time, Money, or Knowledge: What factors are associated with implementing youth cooking programs?

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### Cover Page Footnote

Alison C. Berg <https://orcid.org/0000-0003-1756-2299> Nancy O. Taylor is now working as a clinical dietitian at Children's Healthcare of Atlanta, specializing in pulmonology and general pediatrics. We have no known conflict of interest to disclose. Correspondence concerning this article should be addressed to Alison C. Berg, Department of Nutritional Sciences, University of Georgia, 202 Hoke Smith Annex, 300 Carlton St., Athens, GA 30606, United States. Email: [alisoncberg@uga.edu](mailto:alisoncberg@uga.edu). Acknowledgements: We would like to acknowledge the wonderful Georgia county 4-H and Family and Consumer Sciences Extension faculty and state staff who supported this work through survey participation and/or dissemination and encouragement.

# Time, Money, or Knowledge: What Factors are Associated with Implementing Youth Cooking Programs?

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**Abstract.** Research suggests participating in youth hands-on cooking programs, like those offered by Extension and 4-H, can improve nutrition behaviors and reduce the risk for obesity. We surveyed Georgia Extension professionals (n = 127) to explore factors (e.g., employee characteristics, resources, county demographics) related to offering youth hands-on cooking programs and curricula used. Over 2/3 of participants offer programs and reported creating their own curriculum. More years of experience, having received Extension Specialist training, and increased confidence were positively related to offering these programs. Results suggest training could increase confidence and program implementation and standard curricula may be needed.

## INTRODUCTION

Youth obesity is a public health epidemic (Fryar et al., 2020; Ogden et al., 2020). Georgia ranks 14<sup>th</sup> out of 50 states for youth obesity (16.8% of those ages 10–17 are obese) and 24<sup>th</sup> out of 50 for obesity among high schoolers (18.3% of whom are obese) (Robert Wood Johnson Foundation (RWJF), 2021; Centers for Disease Control and Prevention (CDC), 2019). Childhood obesity increases the risk of immediate and long-term health and social problems including hypertension, dyslipidemia, diabetes, bullying, and discrimination (Estrada et al., 2014; Kohut et al., 2020).

Obesity prevention is challenging due to its complex etiology. Emerging research suggests youth hands-on cooking programs (YHCP) can increase cooking skills and confidence, self-efficacy for selecting healthy foods, and fruit and vegetable preference and intake immediately following the program (Chu et al., 2013; Flego et al., 2014; Garcia et al., 2014; Wrieden et al., 2007) and, in some cases, for six months post-intervention (Flego et al., 2014; Garcia et al., 2014). Moreover, a few interventions have observed reductions in BMI and blood pressure (Davis et al., 2011; Schwartz et al., 2012). Emerging evidence suggests these programs may also impact adult nutrition behaviors, thus creating an additive effect addressing both individual and family behavior (Kohut et al., 2020; Miller et al., 2016).

Historically, Extension and 4-H have provided experiential life skills education. Hands-on cooking programs exemplify the 4-H motto of “learn by doing” and continue to be popular in 4-H and Extension: experts are studying several such programs to determine their impact on nutrition behaviors and cooking self-efficacy (Adedokun et al., 2021; Condrasky et al., 2015; Miller et al., 2016; Petty, 2016; White et al., 2019). In Georgia, many 4-H and family and consumer sciences (FACS) Extension professionals offer YHCP, including general nutrition and cooking programs and programs used to train youth for specific 4-H competitions.

Georgia 4-H hosts several youth cooking competitions. Some competitions include demonstrating a complete recipe or selected steps live, while others involve studying a nutrition and cooking topic and giving a presentation. These competitions are popular, and over 1200 youth participate in 4-H cooking competitions each year. Therefore, Extension professionals may implement hands-on cooking programs specifically to prepare youth for these 4-H food competitions.

4-H and FACS professionals may also offer non-competitive programs aimed at increasing general nutrition knowledge and cooking skills. Some programs are coordinated at the state and national level: the 4-H Healthy Habits program utilizes a variety of nationally-recognized curricula to teach healthy eating and physical activity habits. Others have been developed internally (Hornbeck et al., 2019).

Together, these programs could contribute to obesity prevention by encouraging youth to make healthy food choices, gain cooking skills, and positively impact nutritional home contexts (Haynes-Maslow et al., 2020). However, Extension professionals have varying knowledge and training to implement such programs, and while some standardized materials or curricula are available, it is unknown whether Extension professionals utilize these or create their own, which can influence outcomes. Moreover, while these programs appear popular, there is little existing literature on what factors influence whether Extension professionals implement these programs. Therefore, the primary aims of this study were to (a) determine if Georgia 4-H and FACS youth professionals offered youth hands-on cooking programs currently or within the past two years and if these programs are focused on general nutrition and cooking and/or 4-H competition training programs and (b) to identify factors related to program implementation.

## METHODS

In October 2019, participants were recruited via email sent to Georgia Cooperative Extension (henceforth referred to as “Extension”) listerservs to complete an online Qualtrics survey to assess youth hands-on cooking programs and potentially related implementation factors. The survey remained open for two months, and study organizers sent two follow-up emails. Criteria for valid participants included that the respondent was age 18 years or older and currently an Extension employee with assignment in FACS or 4-H. There were no additional exclusion criteria. All participants provided informed consent and were approved by the University of Georgia Institutional Review Board.

### SURVEY

Prior to distribution, an Extension professional not on the research team reviewed the survey for face validity and readability. The final survey contained 40 questions in the following categories:

#### Participant Characteristics

Participant characteristics included assignment in FACS or 4-H, job title (agent, educator, or program assistant), County Extension Coordinator (administrative role), years worked in Extension, current county, years worked in their current county, and highest educational degree. In Georgia, Extension agents are public service faculty with a minimum of a master’s degree upon hire (or bachelor’s degree upon hire with master’s degree required within three years) who provide education and programming across all areas of FACS (nutrition and health, human development, finance, home, and textiles) and/or 4-H (science, health, agriculture, and civic engagement). Extension educators are staff with

a minimum of a bachelor’s degree, and they typically focus more narrowly on one area of FACS and/or 4-H. Educators may also focus on a specific project or program, like nutrition education in family and consumer sciences or preparing youth for competitive events in 4-H. Program assistants are staff with an associate’s degree, equivalent professional experience, or a professional certificate who support Extension agents and educators and may independently implement specific programs with prior approval from an agent, educator, or specialist.

#### Training

Participants reported participation in food and nutrition trainings (those in the more distant past and those within the past two years), foods and nutrition undergraduate or graduate courses, or other foods and nutrition training.

#### Self-Efficacy

Participants reported their confidence in delivering YHCP on a 5-point Likert scale from 1 = “not at all confident,” to 5 = “extremely confident.”

#### Barriers

Participants rated possible barriers to offering YHCP—such as funding, equipment, space, curricula, training, personnel, youth interest, time, and scheduling—on a Likert- scale from 1 = “not a barrier” to 4 = “extreme barrier.”

#### County Resources

Participants reported (by responding yes or no) whether the county has adequate meeting space, access to a full kitchen (including a sink, stove, and counter space), and basic cooking supplies (e.g., pots and pans, measuring spoons).

#### County Program History

Participants reported if previous Extension professionals had offered YHCP in the county, how much personnel support they received, the program types offered (i.e. day camp v. club), where funds were sourced, ages of participants, and what curricula was used.

#### County Characteristics

County characteristics included:

- rurality according to Rural Urban Continuum Codes (RUCC), where 1 signified most urban and 9 indicated most rural (USDA ERS, 2013),
- Extension district (Northeast, Northwest, Southeast, Southwest) (University of Georgia Extension, 2022),
- county health rankings (RWJF, 2019a, 2019b), and
- county adult obesity prevalence (CDC, 2016).

# Factors Related to Offering Youth Cooking Programs

## Current and Recent Youth Hands-on Cooking Programming

The primary outcome was whether YHCP were delivered in the county. Participants reported whether they offered YHCP within three categories: (a) current programs (any), (b) programs within the past two years specific to preparing youth to participate in 4-H food competitions (4-H training programs), or (c) programs within the past two years that were general nutrition or cooking programs excluding 4-H food competitions (General Nutrition or Cooking Programs).

## STATISTICAL ANALYSIS

We calculated descriptive statistics for respondent and program characteristics. We used seven separate logistic regression models for categories of independent variables to explore the relationships between these independent variables and the primary outcome variables, or the three YCHP types. These categories were: Extension employee characteristics, training, confidence, space and equipment, barriers, history, and county characteristics. Within each category, as appropriate, we calculated Chi square tests, beta coefficients, odds ratios or 95% confidence intervals, and post hoc comparisons using Fisher's least significant differences. Estimated probability and probability differences with standard errors ( $p(SE)$ ) were appropriate for pairwise comparisons using the Wald chi-square test. All analyses were conducted using IBM SPSS statistics version 26 and significance was set to  $p < 0.05$ .

## RESULTS

Of the 130 responses collected, two were excluded for Extension title "other" and one for no assignment in FACS or 4-H. The final sample included 127 participants who answered most questions (Table 1).

## PARTICIPANT AND PROGRAM CHARACTERISTICS

Most respondents had a 4-H assignment, were Extension agents, and had worked approximately 9.5 years in Extension. A little less than half of participants had a master's degree and most (60%) had some Extension Nutrition Specialist training.

Table 2 shows that more than two-thirds of participants regularly offer hands-on cooking programs (current and recent), and 69.4% reported they create their own curriculum for these programs. Program organizers most commonly targeted their programs to youth in 4<sup>th</sup> through 8<sup>th</sup> grade.

## FACTORS ASSOCIATED WITH YOUTH HANDS-ON COOKING PROGRAMS

Table 3 shows regression analyses exploring the relationships of the independent variables with the three program types offered.

**Table 1.** Extension Professional Characteristics

Characteristic	<i>n</i>	<i>M (SD) or %</i>
Extension appointment	127	
FACS		24.4%
4-H		70.9%
FACS and 4-H		4.7%
Percent of time spent in budgeted areas	109	
FACS		25.68 (41.38)
4-H		69.68 (42.04)
Administration		4.33 (11.89)
ANR		0.31 (2.10)
Extension title	120	
Agent		59.2%
Educator		14.2%
Program assistant		26.7%
Years worked in Extension		9.55 (7.75)
Years worked in Extension, current county		7.87 (7.05)
County Extension Coordinator	105	
No		79.0%
Yes		21.0%
Highest educational degree	104	
High school/GED		1.9%
Some college/Associate's degree		9.6%
Bachelor's degree		39.4%
Master's degree		43.3%
Education Specialist		1%
Doctoral Degree		1%
Other		3.8%
Foods and nutrition training by Cooperative Extension Specialists	116	
Yes		60.3%
No		39.7%

## Employee Characteristics

Only the respondents' number of years of employment were significantly associated with whether or not they offer any programs ( $\chi^2(1) = 5.551$ ,  $p = 0.02$ ). For each additional year of employment, the odds of offering any YHCP were 1.24 times greater. FACS appointment was associated with 0.24 times lower odds of offering 4-H food competition training programs ( $\chi^2(1) = 5.73$ ,  $p = 0.02$ ). The pairwise comparison revealed differences between Extension titles. Agents had a significantly greater probability of offering 4-H competition training programs ( $p = 0.75$ ,  $SE = 0.12$ ) than educators ( $p = 0.14$ ,  $SE = 0.12$ ,  $\chi^2(1) = 14.3$ ,  $p < 0.001$ ).

**Table 2.** Youth Hands-On Cooking Program Characteristics

Characteristic	n	%
Offer hands-on cooking programs (% Yes)	110	
Currently Offering Programs (Any)		75.5%
General Nutrition and Cooking Programs (non-competitive)		68.2%
4-H Food competition training programs		65.5%
Other people deliver programs offered	118	
Yes		56.8%
No		43.2%
People who help deliver programs	87	
FACS Agent		31%
4-H Agent		31%
Program Assistant		41.4%
Volunteer		41.4%
Extension Educator		6.9%
Teen Leader		34.5%
Other Assistants		16.1%
Funding sources	89	
County funds		65.2%
Program fee		50.6%
Grant funds		33.7%
Donations		30.3%
Other		7.9%
Type of program	90	
One-time program		41.1%
Day camp		36.7%
Series club		34.4%
Project achievement preparation		55.6%
Preparation for state contest		31.1%
Other		12.2%
Age level of program	91	
PreK		2.2%
Kindergarten – 3 <sup>rd</sup> grade		16.5%
Grades 4 – 6 <sup>th</sup>		85.7%
Grades 7 <sup>th</sup> and 8 <sup>th</sup>		89%
Grades 9 <sup>th</sup> through 12 <sup>th</sup>		70.3%
Curriculum resources	85	
Develop own curriculum		69.4%
Use or adapt other youth curriculum		38.8%
Adapt adult curriculum		10.6%
Other		16.5%

### Training

Having received Extension specialist training was significantly associated with offering all three types of programming. The odds of offering any programming was two times greater for those who received recent training than those with no training. Those recently trained (within the past two years) had the greatest estimated marginal probability of delivering any programming ( $p = 0.90$ ,  $SE = 0.05$ ), followed by those with less recent ( $> 2$  years ago) training ( $p = 0.82$ ,  $SE = 0.10$ ), and then those with no training ( $p = 0.54$ ,  $SE = 0.12$ ). Those who were trained recently and less recently were significantly more likely to deliver any programming than those without training (recent v. no training:  $\chi^2(1) = 8.3$ ,  $p = 0.002$ ; less recent v. no training:  $\chi^2(1) = 4.12$ ,  $p = 0.04$ ), but there was no difference between recent and less recent training ( $\chi^2(1) = 0.55$ ,  $p = 0.44$ ).

For general nutrition or cooking programs, those with recent training were more than seven times as likely to implement programs than those without training. Those who attended training within the past two years were significantly more likely to offering general nutrition and cooking programming ( $p = 0.89$ ,  $SE = 0.05$ ) than those with less recent training (more than two years ago) ( $p = 0.51$ ,  $SE = 0.13$ , recent v. less recent:  $\chi^2(1) = 7.582$ ,  $p = 0.01$ ) or no training ( $p = 0.52$ ,  $SE = 0.11$ , recent v. no training:  $\chi^2(1) = 9.83(1)$ ,  $p = 0.01$ ). There was no difference between those who had received less recent training and those who had not received training in offering general nutrition and cooking programming ( $\chi^2(1) = 0.00$ ,  $p = 0.98$ ).

Having training also increased the odds of offering 4-H competition training programs. The probability of offering 4-H competition training programs was greater for those who had recent ( $p = 0.77$ ,  $SE = 0.07$ ) and less recent ( $> 2$  years ago) ( $p = 0.75$ ,  $SE = 0.07$ ) Extension Nutrition Specialist training than those with no training ( $p = 0.42$ ,  $SE = 0.10$ ) (recent v. no training:  $\chi^2(1) = 8.7$ ,  $p = 0.003$ ); less recent v. no training:  $\chi^2(1) = 5.6$ ,  $p = 0.02$ ). There was no difference between those who had recent and less recent trainings in whether they offered 4-H competition training programs.

Having taken any undergraduate or graduate foods and nutrition courses was not related to offering any of the assessed programs.

### Self-Efficacy

The odds of offering any current programming and general nutrition and cooking programming were 1.98 and 1.79 times higher, respectively, for each additional point on the Likert self-efficacy scale. However, self-efficacy was not associated with offering 4-H food competition training programs.

### Resources

Having adequate meeting space within the Extension office, a full kitchen, or basic supplies were not significantly related to



## Factors Related to Offering Youth Cooking Programs

offering any current programming or general nutrition and cooking programming. However, these physical resources were significantly related to offering 4-H food competition training programs. Those with adequate meeting space had a 2.5 times greater chance of offering 4-H food competition training programs ( $\chi^2(1) = 3.90, p = 0.05$ ). Participants with access to a full kitchen had a 16.1 times greater chance of offering 4-H food competition training programs ( $\chi^2(1) = 10.94, p = 0.001$ ). In contrast, those with basic supplies were less likely to offer 4-H food competition training programs ( $\chi^2(1) = 4.18, p = 0.04$ ).

### Barriers

Only responses related to “your time,” “scheduling,” and “space” were significantly related to any current programming. The higher a participant rated time as a barrier, the less likely they were to offer any current programming. In contrast, the higher they rated scheduling as a barrier, the more likely they were to offer current programming. Neither time nor scheduling reached statistical significance in relation to the other general nutrition and cooking programs or 4-H food competition training programs. Space as a barrier was associated with a lower likelihood of offering 4-H food competition training programs, such that for each additional point on the barriers scale, the odds of offering 4-H food competition training programs are 0.59 times greater.

### History of Programming

Each county’s history of hosting YCHP was not related to whether they offered any of the types of programming assessed (data not shown).

### County Characteristics

The more rural a county (higher RUCC), the less likely they are to offer 4-H food competition training programs. Additionally, a higher ranking from the Robert Wood Johnson Foundation (RWJF) was associated with a greater likelihood of offering a 4-H food competition training program (Table 3).

## DISCUSSION

This study assessed youth hands-on cooking programs (YHCP) within Georgia Extension and factors related to the likelihood of their delivery. Related factors varied slightly between each of the three types of programs: current programs, general nutrition or cooking programs, and 4-H Food competition training programs. However, there was one factor significantly associated with delivering all three types of programs: having received foods and nutrition training from an Extension specialist.

Training was related to all programs, but recent training seemed to be more important for general nutrition or cooking programs compared to 4-H Food competition training programs. Employees who attended training recently may feel more knowledgeable and prepared to implement these programs, as is common in other spheres of continuing education and supports prior research regarding effectiveness of continuing education in furthering knowledge, skills, and self-efficacy (Azvedo & Duarte, 2018; Sarma et al., 2013). In our sample, greater self-efficacy was also associated with implementing general nutrition and cooking programs, but not with 4-H food competition training programs. It is possible that training and confidence are less important for a program that is specific to training youth for a competition with set rules, materials, and expectations.

Another explanation may be that confidence plays less of a role in the Extension professionals’ choice to offer 4-H Food competition training programs, since in many cases the child selects their project area and the Extension professional works to support them in what they have chosen. Also, project achievement is considered a core program in Georgia, so professionals may view these programs as a requirement of their job compared to general nutrition and cooking programs. Finally, other adults—such as parents or volunteers—may work with children on these projects, decreasing the burden on the Extension professional to feel competent in their knowledge and abilities.

Confidence can come from training, years of experience, or both, as more time in a role often signifies greater exposure to formal training and experiential learning (Fine et al., 2017). These relationships should be investigated further to determine if one factor is more important than another.

Notably, formal undergraduate or graduate education was not related to program implementation. These results suggest the importance of on-the-job training, even for those trained formally through degree programs. In fact, on-the-job training is critical: over two-thirds of our study sample reported that they develop their own materials for their programs, which could influence youth knowledge, skills, and behavior outcomes.

While training facilitated program implementation in general, several barriers to program implementation emerged, including available time and space. Those who listed time as a significant barrier may not understand the benefit of these types of programs and therefore do not see the value in using their time to offer them. Or, since two-thirds of our sample indicated they create their own curriculum, they may feel it takes too much time to develop a program or materials. This should be investigated further, but we feel that these results could suggest an urgent need to provide more standardized national or state curricula.

**Table 3.** Logistic Regression Analyses of Relationships Among Extension Employee Characteristics and Offering Youth Hands-On Cooking Programming (n = 127)

Program Type (Dependent Variable)	Current Programs (Any)		General Nutrition or Cooking Programs		4-H Food competition training programs	
<i>Model</i> Independent Variables	Odds Ratio [95% CI]	<i>P</i>	Odds Ratio [95% CI]	<i>P</i>	Odds Ratio [95% CI]	<i>P</i>
<i>Employee Characteristics</i>						
Appointment		0.65		0.44		0.02
FACS	1.30 [0.43, 4.34]		1.56 [0.52, 5.12]		0.26 [0.08, 0.78]	
4-H	1.00		1.00		1.00	
Extension title		0.53		0.57		0.02
Agent	3.06 [0.43, 23.95]		1.20 [0.16, 7.67]		3.97 [0.39, 48.61]	
Educator	2.01 [0.29, 14.73]		2.46 [0.35, 18.70]		0.21 [0.02, 1.72]	
Program assistant	1.00		1.00		1.00	
County Extension Coordinator		0.27		0.53		0.24
Yes	0.43 [0.09, 1.95]		0.62 [0.14, 2.76]		0.39 [0.08, 1.87]	
No	1.00		1.00		1.00	
Highest educational degree		0.64		0.14		0.22
Less than bachelor's degree/other	2.56 [0.26, 28.2]		0.25 [0.02, 2.45]		1.62 [0.12, 24.78]	
Bachelor's degree	1.05 [0.27, 4.75]		0.26 [0.06, 0.98]		3.53 [0.74, 26.46]	
Graduate degree	1.00		1.00		1.00	
Years in Extension	1.24 [1.03, 1.61]	0.02	1.09 [0.96, 1.27]	0.20	1.10 [0.96, 1.31]	0.19
Years in Extension, current county	0.85 [0.66, 1.02]	0.09	1.03 [0.88, 1.20]	0.69	1.02 [0.86, 1.20]	0.83
<i>Training</i>						
Training by Extension Specialists		0.002		0.001		0.02
Yes	2.05 [0.34, 11.41]		7.77 [1.93, 36.15]		1.11 [0.25, 4.40]	
No	0.26 [0.05, 0.98]		1.02 [0.31, 3.28]		0.24 [0.06, 0.85]	
Yes, but > 2 years ago	1.00		1.00		1.00	
Undergraduate and/or graduate training courses in foods and nutrition		0.77		0.13		0.36
Yes	0.82		0.39 [0.10, 1.31]		0.60 [0.19, 1.81]	
No	1.00		1.00		1.00	
Other training		0.73		0.47		0.82
Yes	0.78		1.62 [0.46, 6.630]		0.87 [0.26, 3.02]	
No	1.00		1.00		1.00	
<i>Self-efficacy</i> <sup>a</sup>	1.98 [1.31, 3.07]	0.001	1.79 [1.21, 2.72]	0.003	1.34 [0.93, 1.96]	0.12
<i>Resources</i>						
Adequate office meeting space		0.08		0.78		0.048
Yes	2.23 [0.89, 6.07]		1.14 [0.46, 2.75]		2.52 [1.01, 6.32]	
No	1.00		1.00		1.00	
Full kitchen		0.17		0.57		0.001
Yes	2.57 [0.66, 9.89]		1.47 [0.37, 5.48]		16.12 [2.74, 308.20]	
No	1.00		1.00		1.00	
Basic cooking supplies		0.28		0.29		0.04
Yes	2.56 [0.45, 15.47]		2.47 [0.46, 14.53]		0.10 [0.004, 0.92]	
No	1.00		1.00		1.00	



# Factors Related to Offering Youth Cooking Programs

**Table 3.** (continued)

Program Type (Dependent Variable)	Current Programs (Any)		General Nutrition or Cooking Programs		4-H Food competition training programs	
Model Independent Variables	Odds Ratio [95% CI]	P	Odds Ratio [95% CI]	P	Odds Ratio [95% CI]	P
<i>Barriers<sup>b</sup></i>						
Time	0.27 [0.08, 0.69]	0.005	0.56 [0.23, 1.21]	0.14	1.43 [0.71, 2.99]	0.32
Scheduling	2.75 [1.08, 8.59]	0.03	2.17 [1.01, 5.20]	0.05	1.20 [0.53, 2.26]	0.80
<i>County Characteristics</i>						
Rural Urban Continuum <sup>c</sup>	0.81 [0.62, 1.04]	0.10	0.83 [0.64, 1.06]	0.13	0.73 [0.55, 0.93]	0.01
CES district <sup>d</sup>	0.96 [0.60, 1.51]	0.84	0.74 [0.46, 1.15]	0.18	1.03 [0.67, 1.59]	0.89
RWJF County Health Rankings <sup>e</sup>	1.01 [0.99, 1.02]	0.41	1.01 [1.00, 1.03]	0.07	1.02 [1.00, 1.03]	0.01
Adult obesity prevalence <sup>f</sup>	1.16 [0.96, 1.39]	0.12	0.97 [0.81, 1.16]	0.77	1.08 [0.91, 1.28]	0.40

<sup>a</sup>Self-efficacy Likert scale (1 = “not at all confident,” to 5 = “extremely confident”). <sup>b</sup>Barriers assessed: money/funding, equipment, space, curricula, training, personnel support, youth interest, time, scheduling (1 = “not a barrier” to 4 = “extreme barrier”); Only time and scheduling are shown, as no other variables were significant. <sup>c</sup>USDA ERS, Rural Urban Continuum Codes (RUCC), where 1 = most urban, 9 = most rural. <sup>d</sup>GEORGIA Extension Districts: Northwest (includes Capital, City 1, City 2), Northeast (City 3, City 4), Southwest (City 5, City 6), Southeast (City 7, City 8). <sup>e</sup>Robert Wood Johnson Foundation County Health Rankings, 2019. <sup>f</sup>CDC National Diabetes Surveillance System, 2016.

A lack of space, as well as other responses related to physical resources, was also a barrier to offering 4-H food competition training programs. Those with adequate meeting space and a full kitchen were significantly more likely to offer 4-H competition training programs. Most of these competitions necessitate a full kitchen, since recipes are demonstrated live. Interestingly, those who reported having access to basic cooking supplies were less likely to offer programs, even after adjusting for the other variables within the model and the few participants ( $n = 7$ ) who reported not having basic cooking supplies. Given the number of statistical tests in the study, it is possible that this is a type 1 error and should be further explored. If there is a real effect, it suggests a need for training in these counties to highlight the benefits of offering a YHCP with basic cooking supplies.

In contrast, meeting space, kitchen space, and basic supplies were unrelated to offering any programming and to general nutrition and cooking programs. Thus, counties may have the resources needed to hold these programs, or this may suggest differences among program areas (FACS v. 4-H) in the resources available to conduct such programs. It's also possible that professionals adapt these programs to fit the resources they have, as they are not bound by competition rules. Lastly, Extension professionals may have the required resources but need additional training that helps them understand why this type of program is worth their time.

While youth obesity is a problem everywhere, there may be more need for these programs in disadvantaged communities. Rural communities experience disproportionately negative health outcomes and lower access to health care, resources, and education (University of Wisconsin Population Health Institute, 2021). In general, and in our study, the more rural the community, the poorer the health ranking ( $\rho = 0.589$ ,  $p < 0.001$ ), yet rural communities were less likely to offer programs, and those with poorer health outcomes more likely to offer programs. While we seek to better understand these relationships, Extension might consider prioritizing these programs in rural counties and ensuring that Extension professionals are trained and have the resources to deliver all types of YHCP to promote health equity. Moreover, Extension administrators should ensure that professionals in all communities have proper training and that programs are evidence-based or informed so as not to deepen disparities.

One strength of this study is its comprehensive assessment of many factors that may influence program delivery, yet this research is not without limitations. Not all respondents completed every question, and there could have been some misunderstanding of questions and social desirability bias. Further, this was a subjective assessment of current and past activity; future investigations could consider comparing participant responses with objective program reports. While this study is limited to Georgia, 4-H and FACS

Extension are not specific to this state, and cooking programs are popular across the nation, with far-reaching implications for public health.

## CONCLUSION

This study revealed that training, confidence, time, space, and rurality were related to offering hands-on cooking programs in Georgia Extension. Extension should offer frequent foods and nutrition trainings that not only provide knowledge and skills, but also stress the potential long-term impact of these programs on youth and family health. By increasing the perceived benefit of these programs, Extension professionals may be more likely to use their time to implement YHCP. Administrators should strongly consider standardized, evidence-based curricula to save time, encourage consistency, and promote accuracy of the nutrition and health information disseminated. Extension is in a powerful position to impact childhood obesity nationwide through youth hands-on cooking education, but programs should be evidence-based, delivered by trained professionals, adequately resourced, and implemented equitably to benefit all youth.

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