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Teens Teach Nutrition Virtually to Youth During COVID-19: Improved Leadership Skills and Health Behaviors

Wendy S. Wolfe
Cornell University Division of Nutritional Sciences, ww16@cornell.edu

Jacqueline Davis-Manigaulte
Cornell University Cooperative Extension NYC, jad23@cornell.edu

Dana M. Wheeler
Police Athletic League, Inc. (now at ExpandED Schools, Inc.), danamwheeler04@gmail.com

Emma R. Dhimitri
Cornell University student intern (now at Colorado State University Extension), erd48@cornell.edu

Josie G. Ford
Cornell University student intern (now at Massachusetts General Hospital Department of Medicine), jgf79@cornell.edu

See next page for additional authors

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Cover Page Footnote

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Authors

Wendy S. Wolfe, Jacqueline Davis-Manigaulte, Dana M. Wheeler, Emma R. Dhimitri, Josie G. Ford, Kieu A. Phan, and Dylan G. Ratnarajah

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Teens Teach Nutrition Virtually to Youth During COVID-19: Improved Leadership Skills and Health Behaviors

Wendy S. Wolfe[1], Jacqueline Davis-Manigaulte[2], Dana M. Wheeler[3], Emma R. Dhimitri[1], Josie G. Ford[1], Kieu A. Phan[1], and Dylan G. Ratnarajah[1]

AUTHORS: [1]Cornell University. [2]Cornell University Cooperative Extension. [3]Police Athletic League, Inc.

Abstract. The Choose Health Action Teens (CHAT) program of Cornell Cooperative Extension engages teens to teach a nutrition curriculum to younger youth, with the goal of enhancing the leadership skills and health behaviors of the teen teachers. Due to COVID-19, an in-person CHAT program in New York City was converted to virtual and implemented online during Summer 2020. Twelve teens, mentored by eight college interns, taught youth virtually in their homes. Quantitative and qualitative assessments demonstrated improvement in teen leadership and facilitation skills and health behaviors, and suggest that converting this type of programming to a virtual environment can be successful.

INTRODUCTION

Engaging teens to teach younger youth by using positive youth development (PYD) practices can create supportive and empowering environments that provide activities for teens to build valuable skills. Research suggests that the Teens-as-Teachers approach (TAT) has many developmental benefits, enhancing leadership and other skills for teen teachers (Klisch & Soule, 2021; Worker et al., 2018). Improved teen health behaviors can be an additional outcome when the TAT model is applied to healthy living and nutrition programming.

Rates of teen obesity are high and rising, now at 21% nationally and even higher in low-income communities of color (Ogden et al., 2020). Additionally, most adolescents do not meet national dietary recommendations (Thomson et al., 2019). Studies suggest that nutrition programs that employ TAT can spark positive health behavior change outcomes (Arnold et al., 2016; Weybright et al., 2018). Research on practical ways to promote improved teen health behaviors is greatly needed, especially on ways to engage urban teens and those of color.

This article focuses on the Choose Health Action Teens (CHAT) program, a collaboration between Cornell Cooperative Extension's 4-H and Expanded Food and Nutrition Education (EFNEP) programs. CHAT employs a TAT model in which teens teach a nutrition curriculum to younger youth, with the goal of enhancing teen leadership skills while also improving teen and youth health behaviors. Prior to the COVID-19 pandemic, CHAT was conducted in person. Here, we report on CHAT's first virtual implementation, in New York City (NYC) during the summer of 2020, which included college interns as teen mentors. We describe how the teens' virtual teaching experience influenced their leadership and facilitation skills as well as their personal health behaviors and discuss the challenges and opportunities that accompanied adapting an existing program to a virtual format.

METHODS

THE INTERVENTION

In CHAT, teens teach the six-lesson evidence-based Choose Health: Food, Fun, and Fitness (CHFFF) curriculum developed by Cornell University's Division of Nutritional Sciences. CHFFF engages students in Grades 3–8 (ages 8–15) and uses experiential learning activities, food tasting, active games, goal setting, and a family newsletter to promote behaviors that prevent excess weight gain and decrease chronic-disease risk (Wolfe & Dollahite, 2021; Wolfe et al., 2018). Topics include reducing consumption of sweetened drinks and high-fat/high-sugar foods; increasing consumption of vegetables, fruits, and whole grains; and increasing physical activity (Wolfe, 2018). Using the CHAT Facilitator

Guide, local Extension educators train and support teens to teach the CHFFF lessons in various settings.

Cornell Cooperative Extension NYC (CCE-NYC) began implementing summer CHAT programs in 2018 in collaboration with the Police Athletic League, Inc. (PAL) and Cornell's Division of Nutritional Sciences. An innovation added in 2018 by the project leaders from these three institutions was to train and support college interns who served as the primary mentors for the teens.

For the summer of 2020, the program was implemented completely virtually due to the COVID-19 pandemic, with everyone connecting from their own homes or other locations. Eight Cornell University and City University of New York college interns were trained in CHAT and CHFFF by the project leaders. The interns then led conversion of the CHFFF lessons to interactive PowerPoint slides for virtual use, using creativity and technical skills to keep the lesson activities interactive and engaging while maintaining strong fidelity to the original curriculum. They also created recipe videos and virtual active games to replicate the in-person experience. Three teams (A, B, C) of two to three interns were each assigned to convert two of the six lessons, which included scripted notes (Figure 1). Converted lessons were then refined by the project leaders, college interns, and teens during internal piloting and teen training.

Teens with high motivation, leadership potential, and/or interest in health or teaching were recruited by PAL from those already involved in their afterschool programs. Twelve teen teachers were selected, with a mean age of 17.1 years (range: 15–18); 75% were seniors entering college, 58% were male, 92% identified as African American/Black, and 25% identified as Latinx. CCE-NYC provided teens with stipends, using external funds. PAL also recruited 18 youth participants for CHFFF via phone calls, emails, and social networking; response was lower than prior in-person programs due to the pandemic, with some youth not joining until after the first or second lesson, and attendance somewhat irregular. Youth participants' average age was 10.9 years; 25% were male, 50% were African American/Black, 12% were White, and 25% were Latinx.

The project leaders and college interns jointly trained the 12 teen teachers via daily 2-hour Zoom sessions over 2 weeks, with teen attendance near 100% (Figure 2). Training included lesson demonstrations and teen teach-backs, plus facilitation skills, PYD, and behavior management. Two pairs of teens were assigned to each of the three intern teams (A, B, C) and learned to jointly teach their two assigned CHFFF lessons by practicing within and between teams, mentored by their interns. Teens received feedback from interns and peers. Peers modeled the constructive feedback approach used by the interns.

Teen pairs, assisted by their college interns, then delivered their lessons live via Zoom to youth participants, who joined from their homes through PAL's online platform, for digital safety. Sometimes, family members accompanied the youth participants. Two lessons per week were taught over 3 weeks to four different groups of youth; each teen pair taught each of their lessons twice. The PAL project leader supervised the virtual teaching sessions and gave the teens immediate feedback; the interns then provided formal in-depth debriefing. Perishable and nonperishable ingredients, cooking supplies, and the CHFFF newsletters containing the recipes were sent to the homes of youth participants and teen teachers via mail and a local grocery delivery service to encourage them and their families to prepare the recipes after viewing recorded recipe demonstrations as part of the lessons.

EVALUATION METHODS

Outcomes for teen teachers were evaluated quantitatively and qualitatively by using four assessment tools, two assessing PYD-related skills and two assessing health behaviors. Quantitative pre–post results were analyzed in *R* and Excel by using paired *t* tests.

Teaching teams and CHFFF lessons taught

(2–3 college interns and 4 teen teachers per team)

Team A	Team B	Team C
Lesson 1: Sweetened Drinks	Lesson 2: Vegetables & Fruits	Lesson 3: Snacks & Nutrition Labels
Lesson 4: Whole Grains	Lesson 5: Fast Foods	Lesson 6: Breakfast & Review

Figure 1. Teaching team structure and CHFFF lesson content, CCE-NYC virtual CHAT program.

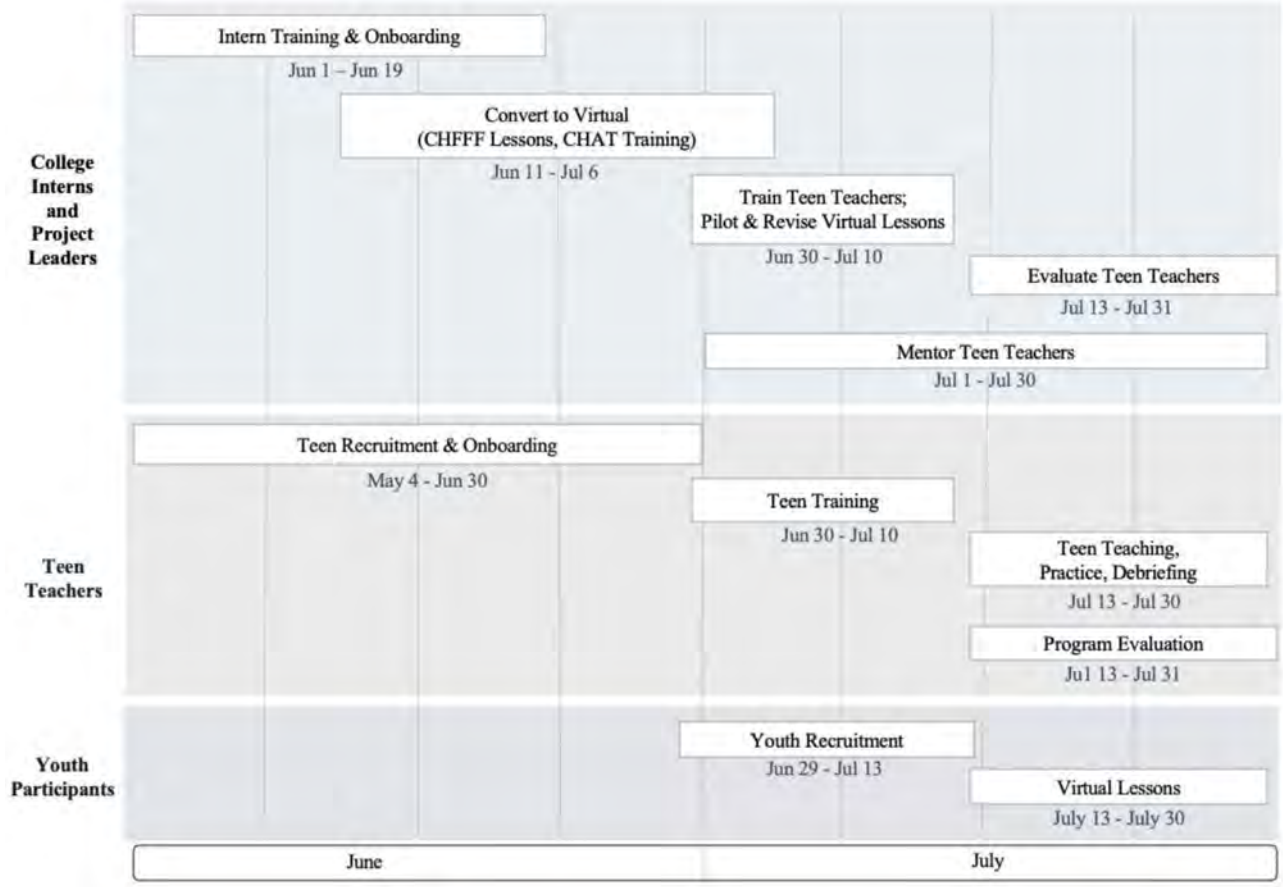

Figure 2. CCE-NYC virtual CHAT program structure and summer 2020 implementation timeline. Planning by project leaders began in January, including intern recruitment, project and home-kit logistics, timeline, and more.

LEADERSHIP SKILLS SURVEY

Teen teachers completed an online evaluation during a final team meeting the day after teaching ended. The survey was adapted from a tested instrument designed to assess elements of the teen teaching experience in TAT programs (Arnold et al., 2016). Teens self-assessed their leadership skills, role-modeling ability, and teaching confidence before and after the program via a retrospective pretest–posttest design. Additional post-only quantitative and open-ended questions further assessed these elements as well as programmatic support.

LESSON OBSERVATION OF FACILITATION SKILLS

During practice and live teaching sessions, interns used a standard form created for CHAT to rate each teen teacher on 13 indicators across six skills from "needs improvement" to "very good"; comments about the skills and responses to four debriefing questions were also recorded. To assess change, results from each teen's first practice teach-back were compared to their final live teaching session, using paired *t* tests for item scores; comments were analyzed qualitatively.

HEALTH BEHAVIOR PRE–POST SURVEY

Dietary intake, food choice, physical activity, and food-preparation skills were assessed via a modified 13-item version of the standard federal EFNEP Grades 9–12 pre–post survey. The Cornell project leader administered the questions orally during the teen teachers' first group training session and again the day after teaching ended; teens recorded their answers individually online.

HEALTH BEHAVIOR GOAL-SETTING FORMS

Using a standardized form, teen teachers were asked to set one or more personal behavior goals after experiencing each lesson during training. Then, as they taught the lessons over the following weeks, they were asked to record actions they took toward each goal. Results were analyzed qualitatively.

RESULTS

LEADERSHIP SKILLS

After their CHAT experience, teen teachers' self-reports of leadership skills and role modeling improved significantly.

The other six elements assessed pre–post also improved, but not significantly (Table 1). In terms of programmatic support, most teens strongly agreed that they received adequate support, feedback, and training to be effective and successful teachers.

In response to open-ended questions assessing important skills developed and perceived teaching/role-model ability, teen teachers (n = 11) described improving in the following ways, which align with the "Five Cs" of the PYD model (Lerner et al., 2013):

- *Competence* in leadership, teaching, and communication skills (n = 16 responses)
- *Character*, such as responsibility, patience, how to make a commitment (n = 11)
- *Confidence*, primarily in teaching and other leadership skills (n = 8)
- *Connection*, including teamwork skills, such as how to collaborate and work together (n = 8)
- *Caring*, such as making sure youth feel comfortable during teaching (n = 5)

FACILITATION SKILLS

Teens improved across all six facilitation skills assessed quantitatively. Ten of the 13 indicators improved significantly, with final scores of 3.7 or above out of 4.0 for all but two items (Table 2).

Analysis of intern comments supported these findings. Teen teachers greatly improved their interaction with youth participants and screen presence with inviting, inclusive approaches, such as using participants' names; five teens needed improvement beforehand, while four of these plus three others received intern compliments in this area at program end. The teens became more comfortable teaching over time, with noted increased confidence and decreased nervousness. Six teens received praise for improvement in energy, enthusiasm, and variance of their tone and expression, and six received praise for greater lesson personalization. Teens also became more supportive, encouraging, and patient and developed new ways to handle incorrect or off-topic answers, such as asking other participants for input before explaining. Finally, teens improved in engaging participants by speaking more clearly, putting lessons into their own words, and keeping the lessons moving, as reflected by interns' comments for five, six, and seven teens, respectively.

Table 1. Teens' Self-Report of Leadership Skills and Other Elements of the Teaching Experience

Leadership skills and related elements1 (retrospective pre–post, n = 9 teens)	**Mean initial score**	**Mean final score**	**Mean change**
I am a role model for younger youth.	3.44	3.78	0.34
I want to be a role model for others.	3.22	3.78	0.56**
I have leadership skills.	3.22	3.89	0.67*
I know how to use my leadership skills.	3.33	3.89	0.56†
I am capable of teaching others.	3.56	3.89	0.33
I am capable of leading others.	3.44	3.89	0.45†
I want to contribute my skills to help others.	3.22	3.78	0.56
I want to contribute my skills to help my community.	3.44	3.78	0.34
Programmatic support (post- only, n = 10 teens)	**Mean score**	**Percentage who strongly agreed**	
There were dedicated adults who supported me as a teen teacher.	3.9	90%	
I received ongoing training and support throughout the program.	3.9	90%	
I felt set up for success by the adults running the program.	3.9	90%	
I received feedback on how well I was doing as a teacher.	3.9	90%	
I was provided with a curriculum to follow as I taught in this program.	3.9	90%	
The program made sure I had everything I needed to be successful as a teen teacher.	3.7	70%	
I received training on how to be a teen teacher before the program began.	3.7	70%	
I participated in team building with other teen teachers in the program.	3.6	60%	

Note. For the retrospective pre–post, teen teachers were asked the eight items above in past tense "before the program" and as written here "after the program." Both these and the post- only items were based on a score of 1 (strongly disagree) to 4 (strongly agree).
† $p < 0.10$. *$p < 0.05$. ** $p < 0.01$.

Table 2. Improvement in Facilitation Skills From Teen Teachers' First Practice Teach-Back to Their Final Live Teaching Session

Facilitation skill	Indicator (as written on form)	Mean initial score	Mean final score	Mean change
Invite, include	Made participants feel comfortable, respected	3.9	4.0	0.1
	Made eye contact,[a] called participants by name	3.4	3.9	0.5*
Energize	Showed enthusiasm for topic and participants	3.1	3.8	0.7**
	Changed voice, smiled	3.1	3.8	0.6**
Encourage	Was supportive and encouraging, did not call on individuals	3.6	4.0	0.4*
	Reacted positively to children, even if incorrect or off-topic	3.5	3.7	0.2
Engage and keep it moving	Spoke loudly and clearly	3.3	3.8	0.5**
	Put lesson in own words	3.1	3.8	0.7**
	Kept lesson fast-paced; more time doing than explaining	2.8	3.5	0.7**
	Gave clear, concise directions	3.0	3.5	0.5
Wait, 3 before me	Waited 5 seconds after asking a question to let kids think and respond	3.2	3.8	0.6**
	Allowed 2 or 3 children to respond before jumping in	3.1	3.8	0.7**
Prepared	Knows lesson (prepared, asks and answers questions, etc.)	3.1	3.7	0.6**

Note. Based on average lesson-observation form ratings by the college interns, from 1 (needs improvement) to 4 (very good); (n = 12 teens).

[a] "Eye contact" on the form was interpreted as general screen presence because the lessons were virtual.

* $p < 0.05$. ** $p < 0.01$.

Table 3. Changes in Teen Health Behaviors From Before Their CHAT Training to After Teaching the Lessons

Outcome variables	Response options [a]	Mean at pretest	Mean change	% Who improved >1 point	*n*
Dietary intake					
Sweetened drink intake	0–3+ times/day	1.56	–0.8*	66.7%	9
Vegetable intake	0–4+ times/day	1.78	1.1*	44.0%	9
Fruit intake	0–4+ times/day	1.33	1.7*	66.7%	8
Milk intake	0–4+ times/day	0.38	1.0	63.0%	9
Food-choice behavior					
Frequency of whole grain selection when eating grains	0 = Never 1 = Once in a while 2 = Sometimes 3 = Most of the time 4 = Always	1.78	0.7*	67.0%	9
Frequency of healthy-choice selection when eating out		1.67	0.4	67.0%	9
Physical activity					
Days/week active > 1 hour	0–4+ hours/day	3.56	0.9	56.0%	9
High-intensity activity	0–4+ days/week	1.89	1.4*	67.0%	9
Screen time	0–5+ hours/day	3.88	–0.5*	50.0%	8
Food-preparation skills					
Confidence in using measuring tools	0 = Not confident 1 = Somewhat confident 2 = Confident 3 = Totally confident	2.1	0.7*	50.0%	10
Confidence in following recipes		2.0	0.7*	60.0%	10

Note. $n = 10$ teens

[a] 3+, 4+, and 5+ responses were treated as whole numbers (3, 4, and 5)

* $p < 0.05$. ** $p < 0.01$.

Table 4. Types and Examples of Actions Teen Teachers Reported Toward Personal Goals They Set Based on Each CHFFF Lesson

Types of actions taken, by CHFFF lesson content	Example teen teacher quotes
More water: 8 actions Fewer sweetened drinks: 7 More low-fat milk: 3 (CHFFF Lesson 1)	"I drink water after working out instead of Gatorade." "I started to drink more water instead of juices." "I stopped drinking soda and other 'Stop Drinks.'" "I look for low-fat milk instead of whole when shopping."
More vegetables/fruit: 8 (Lesson 2)	"I began eating more fruit with my breakfast and salads with my dinner."
Healthier snacks: 5 (Lesson 3)	"I replaced snacks high in sugar with snacks low in fat, such as pretzels [and] fruits."
More whole grains: 8 (Lesson 4)	"I have been eating whole-grain bread ever since [Lesson 4], and I like it more than white bread now."
Eat less fast food: 6 (Lesson 5)	"Instead of eating fast food, I replaced it with recipes that we have learned." "When I went to a fast food restaurant, I shared my meal with my little brother."
Healthier breakfasts: 4 (Lesson 6)	"I started eating cereals low in sugar, even oatmeal."
Used nutrition-facts label to choose healthier: 19 (9 specified "when shopping") (Lessons 1, 3, 4, 6)	"I started reading nutrition labels and sharing interesting facts with adults." "[I look] at the amount of fat and added sugar at the store [so] I won't even have snacks high in fat and added sugar in my house." "I made a habit of looking at fiber and added sugar when shopping."

Note. See Figure 1 for the content of each CHFFF lesson. n =9 teens for Lessons 1–5 goals; n = 4 for Lesson 6 goals. Various other actions were listed that did not fit into these or other categories.

TEEN HEALTH BEHAVIOR CHANGE

Pre–Post Survey

Teen teachers reported significant improvement in dietary intake, with decreased consumption of sweetened drinks and increased consumption of vegetables, fruit, and whole grains (Table 3). Physical activity and food preparation confidence also improved significantly, while screen time decreased significantly.

Goal-Setting

Teen teachers reported taking 80 different actions toward the goals they set, which reflected the content of CHFFF lessons (Table 4). More than half were dietary changes, while the rest were healthy practices, primarily using nutrition-facts labels to choose healthier foods.

DISCUSSION

In this virtually delivered TAT nutrition program, teens reported not only adopting healthier eating behaviors but also gaining leadership and facilitation skills. Improved leadership outcomes included competence, such as learning nutrition content and facilitation skills, confidence in teaching skills, and connection through improved communication and teamwork skills. Teen teachers also became more engaging and encouraging of youth participants as their teaching confidence increased. Improved health behaviors reflected the nutrition content they taught and included increased intake of vegetables, fruits, and whole grains and decreased intake of sweetened drinks. These behavior changes suggest that teens learned and adopted practices they taught to younger youth.

In-person TAT nutrition programs, including earlier evaluations of CHAT (Smith, 2014; Wolfe, 2014) and a different TAT program that used CHFFF as the curriculum (Weybright et al., 2018), have similarly shown improved PYD indicators and health behaviors (Arnold et al., 2016; Bolshakova et al., 2018; Klisch & Soule, 2021; Story et al., 2002). This result suggests that virtual delivery can be an effective implementation method for TAT nutrition programs as well as other Extension programs that use TAT.

A proposed mechanism for the improved leadership, facilitation skills, and other developmental outcomes of TAT programs is that they promote the Five Cs of PYD: competence, character, confidence, connection, and caring. Teens thrive when given opportunities to grow and strengthen in these areas (Leman & Wang, 2021; Worker et al., 2018). We used all four research-based strategies recommended

by Arnold and Rennekamp (2020) to promote PYD in 4-H programming during COVID-19: Support youths' need to belong, develop "sparks" or intrinsic motivators, foster youth-adult relationships, and facilitate authentic leadership and service opportunities. Despite being virtual, our CHAT program supported the teens' development of the Five Cs of PYD by using these strategies.

These strategies paralleled Lee and Murdock's (2001) 10 essential elements of successful TAT programs, which were incorporated into the development of CHAT, such as ongoing training and support by dedicated adults. Weybright et al. (2018) emphasized expanding on these basic elements to ensure *comprehensive* mentor training, including training on PYD and experiential learning, and *inclusion of adult mentors in initial teen training*. Our CHAT program did all of this, training college interns as mentors who assisted in training and supporting the teen teachers. Others have suggested that positive TAT outcomes were also due to how meaningful teens found the opportunities for real contribution and authentic service provided through TAT programming (Bird & Subramaniam, 2018; Worker et al., 2018). Our teen teachers' dedication and responsibility, with excellent attendance and commitment to individual lesson practice, seemed to reflect this, especially with authentic opportunities limited due to the pandemic. The teens also showed empathy in their interactions with youth and when providing peer feedback in their teams, creating genuine connections with youth participants, their peers, and interns.

A suggested pathway for the improved health behaviors observed in TAT programs is that TAT fosters teen teachers' internalization of the curriculum taught and promotes self-efficacy, increasing lesson knowledge and related healthy behaviors (Smith, 2014; Weybright et al., 2018). In our program, the significant improvement in diet and increase in healthy practices, such as using nutrition-facts labels, also may have been attributed to teen goal-setting, a strategy others have found effective (Black et al., 2010). The intentional repetition of key nutrition messages across multiple lessons likely also contributed.

LESSONS LEARNED

The use of college student interns as primary teen mentors allowed more frequent interactions than the project leaders alone could have provided and likely contributed to program success. Their reinforcement of the initial training via one-on-one practice sessions, along with individualized feedback, supportive debriefing, and role modeling, resulted in the teen teachers feeling well supported, as indicated by their survey responses. Teens also expressed informally how much they enjoyed working with the interns, who may have been more relatable role models. Other TAT programs have also found that access to mentors helped advance teen leadership skills (Redmond & Dolan, 2016), and Black et al. (2010) found that individual nutrition mentoring of low-income Black teens by college students not only improved their diets but also reduced obesity 2 years later.

With the virtual format, project leaders, interns, teen teachers, and youth participants all connected remotely from their own homes or other spaces, with different learning environments. This setting meant that building rapport sometimes required overcoming poor Internet connections, small cell-phone screens, or background distractions. Keeping the lessons fast-paced and providing clear, concise directions were the most challenging facilitation skills, improving only insignificantly, likely due in part to the different learning environments. Nonetheless, the teen teachers progressively improved their interaction with youth participants, including screen presence, clear speech, and patience with technical issues. They also scored high from the beginning in making participants feel comfortable and respected, explaining that category's limited improvement.

The virtual format also brought about unexpected advantages. It allowed family members to participate, encouraging intergenerational impact and healthier home environments, both of which are important for healthy youth dietary habits (Pearson et al., 2017; Yee et al., 2017). It also eliminated the need for travel, improving attendance compared to in-person CHAT in past years and enabling teens to synchronously teach lessons from locations across NYC and more easily meet with their interns and other team members. This convenience created a motivating environment that enhanced sharing, teamwork, and team building with teens from other communities and led teens to help each other when issues arose during live lessons during a socially isolating period.

STRENGTHS, LIMITATIONS, AND FUTURE DIRECTIONS

The small number of teen teachers in this implementation study limits interpretation of statistical analyses but is realistic in relation to the size of most programs conducted, and positive changes were clear, significant, and supported by qualitative data. This study did not evaluate outcomes for youth participants, a significant limitation and an important area for future research. Although CHFFF taught by Extension nutrition educators has been shown to improve youth health behaviors (Wolfe & Dollahite, 2021), similar impact by teen teachers has not yet been demonstrated. Nonetheless, comments from parents and youth suggest positive outcomes: "I am so thankful for this nutrition program. Now my kids are drinking way more water than juice or sodas, adding more fruits and veggies to their meals; even I am eating better" (parent of youth participant) and "I used to think that yogurt didn't have any sugar in it, but I guess it does!" (8-year-old participant). A longitudinal study of health behavior changes in youth participants and teen teachers could assess the persistence of these effects.

Additional research is recommended to more thoroughly understand the impact of CHAT on teen leadership skills and PYD, and the strengths and limitations of virtual implementation from the teen perspective. A more purposeful evaluation of involving college interns as mentors could also be informative, particularly how the college interns influence teens, including future career plans, and how the program affects the interns themselves—for example, others have shown improved dietary habits in college student nutrition mentors of teens (Black et al., 2012). Evaluation of outcomes for youth participants is also recommended, and perhaps also their families, as delivering the program virtually to the homes of teens and youth participants allows for active involvement of family members, with potential for intergenerational impact on health behaviors that may go beyond the usual practice of only involving families via newsletters and such, especially if they receive recipe ingredients, like in this project.

IMPLICATIONS

Our findings suggest that adapting current Extension programs to online formats can be successful and that CHAT can promote key aspects of PYD and positive health behaviors among teens when delivered remotely. The addition of recipe demonstration videos and food delivery enlivened the virtual experience while keeping fidelity to the original CHFFF curriculum. The virtual format made meeting with mentors and program leaders more convenient. The positive PYD outcomes suggest that the TAT model could be useful in a wide range of other types of youth Extension programs and has the potential to reach more people, including multigenerational learners in a virtual environment.

REFERENCES

Arnold, M. E., Flesch, J. M., Ashton, C., Black, L., Brody, B., Hosty, M., & Northway, S. (2016). YA4-H! Youth Advocates for Health: Impact of a 4-H teens-as-teachers program. *Journal of Extension*, *54*(6), Article 13. https://tigerprints.clemson.edu/joe/vol54/iss6/13/

Arnold, M. E., & Rennekamp, R. A. (2020). A time like no other: 4-H youth development and COVID-19. *Journal of Extension*, *58*(3), Article 32. https://tigerprints.clemson.edu/joe/vol58/iss3/32

Bird, M., & Subramaniam, A. (2018). Teen staff perceptions of their development in camp: Insights for theory and practice. *Journal of Youth Development*, *13*(1–2), 62–82. https://doi.org/10.5195/jyd.2018.568

Black, M. M., Arteaga, S. S., Sanders, J., Hager, E. R., Anliker, J. A., Gittelsohn, J., & Wang, Y. (2012). College mentors: A view from the inside of an intervention to promote health behaviors and prevent obesity among low-income, urban, African American adolescents. *Health Promotion Practice*, *13*(2), 238–244. https://doi.org/10.1177/1524839910385899

Black, M. M., Hager, E. R., Le, K., Anliker, J., Arteaga, S. S., DiClemente, C., Gittelsohn, J., Magder, L., Papas, M., Snitker, S., Treuth, M. S., & Wang, Y. (2010). Challenge! Health promotion/obesity prevention mentorship model among urban, Black adolescents. *Pediatrics*, *126*(2), 280–288. https://doi.org/10.1542/peds.2009-1832

Bolshakova, V., Gieng, J., & Sidhu, C. (2018). Teens-as-teachers nutrition program increases interest in science among schoolchildren and fosters self-efficacy in teens. *California Agriculture*, *72*(2), 135–143.

Klisch, S., & Soule, K. E. (2021). 4-H Student Nutrition Advisory Councils support positive youth development and health outcomes among underserved populations. *Journal of Extension*, *59*(3), Article 19. https://tigerprints.clemson.edu/joe/vol59/iss3/19/

Lee, F. C., & Murdock, S. (2001). Teenagers as teachers programs: Ten essential elements. *Journal of Extension*, *39*(1), Article 8. https://tigerprints.clemson.edu/joe/vol39/iss1/8/

Leman, A. M., & Wang, J. (2021). Leadership life skills development in 4-H teen leadership programs. *Journal of Extension*, *59*(3), Article 20. https://tigerprints.clemson.edu/joe/vol59/iss3/20/

Lerner, R. M., & Lerner, J. V., et al. (2013). *The positive development of youth: Comprehensive findings from the 4-H study of positive youth development*. National 4-H Council. https://dunn.extension.wisc.edu/files/2018/04/4-H-Study-of-Positive-Youth-Development-Full-Report.pdf

Ogden, C. L., Fryar, C. D., Martin, C. B., Freedman, D. S., Carroll, M. D., Gu, Q., & Hales, C. M. (2020). Trends in obesity prevalence by race and Hispanic origin—1999–2000 to 2017–2018. *Journal of the American Medical Association*, *324*(12), 1208–1210. https://doi:10.1001/jama.2020.14590

Pearson, N., Griffiths, P., Biddle, S. J. H., Johnston, J. P., & Haycraft, E. (2017). Individual, behavioural and home environmental factors associated with eating behaviours in young adolescents. *Appetite*, *112*, 35–43. https://doi.org/10.1016/j.appet.2017.01.001

Redmond, S., & Dolan, P. (2016). Towards a conceptual model of youth leadership development. *Child and Family Social Work*, *21*(3), 261–271. https://doi.org/10.1111/cfs.12146

Smith, A. J. (2014). *Peer health teaching improves nutrition behaviors in the teen teacher population* [Master's thesis]. University of Nebraska. https://digitalcommons.unl.edu/nutritiondiss/48/

Story, M., Lytle, L. A., Birnbaum, A. S., & Perry, C. L. (2002).

Peer-led, school-based nutrition education for young adolescents: Feasibility and process evaluation of the TEENS study. *Journal of School Health*, *72*, 121–127. https://doi.org/10.1111/j.1746-1561.2002.tb06529.x

Thomson, J. L., Tussing-Humphreys, L. M., Goodman, M. H., & Landry, A. S. (2019). Diet quality in a nationally representative sample of American children by sociodemographic characteristics. *American Journal of Clinical Nutrition*, *109*(1), 127–138. https://doi.org/10.1093/ajcn/nqy284

Weybright, E., Diaz Martinez, A., Varrella, G., Deen, M., & Wright, K. (2018). Teens as teachers: Positive outcomes and recommendations for promoting healthy nutrition in adolescents. *Journal of Youth Development*, *13*(3). https://doi.org/10.5195/jyd.2018.595

Wolfe, W. S. (2014). *Choose Health Action Teens (CHAT) Evaluation Report*. Unpublished report, Division of Nutritional Sciences, Cornell University. https://fnec.cornell.edu/for-partners/programs/chat/

Wolfe, W. S. (2018). Choose Health: Food, Fun and Fitness, an experiential youth curriculum that promotes healthy eating and active play. *Journal of Nutrition Education and Behavior*, *50*(10), 1053–1055. https://doi.org/10.1016/j.jneb.2017.09.011

Wolfe, W. S., & Dollahite, J. (2021). Evaluation of the Choose Health: Food, Fun, and Fitness 3rd- to 6th-grade curriculum: Changes in obesity-related behaviors. *Journal of School Health*, *91*(1), 9–18. https://doi.org/10.1111/josh.12970

Wolfe, W. S., Scott-Pierce, M., & Dollahite, J. (2018). Choose Health: Food, Fun, and Fitness youth curriculum promotes positive behaviors. *Journal of Nutrition Education and Behavior*, *50*(9), 924–930. https://doi.org/10.1016/j.jneb.2017.09.008

Worker, S. M., Iaccopucci, A. M., Bird, M., & Horowitz, M. (2018). Promoting positive youth development through teenagers-as-teachers programs. *Journal of Adolescent Research*, *34*(1), 30–54. https://doi.org/10.1177/0743558418764089

Yee, A. Z., Lwin, M. O., & Ho, S. S. (2017). The influence of parental practices on child promotive and preventive food consumption behaviors: a systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*, *14*(1), 47. https://doi.org/10.1186/s12966-017-0501-3