

# A Call for Culinary Skills Education in Childhood Obesity-Prevention Interventions: Current Status and Peer Influences

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## ARTICLE INFORMATION

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**D**URING THE PAST DECADE, THERE HAS BEEN AN interest in resurrecting formal culinary skills education for youths (ie, school-aged children). These pursuits have been provoked by what policy makers, scientists, and food and nutrition practitioners suggest is a societal decline in culinary skills.<sup>1-3</sup> Some stakeholders believe that this “de-skilling”<sup>1</sup> represents a transition<sup>3</sup> caused by sociodemographic shifts, such as nontraditional family structures, women in the workforce, and time constraints. Current consumers have new value equations for making food decisions. Although health, taste, cost, and convenience predict food choices,<sup>4</sup> cost and convenience are weighted with more value than ever before.

Cooking from scratch is no longer the norm in consumers' kitchens.<sup>3</sup> Dramatic changes in domestic cooking practices have led to decreased transference of essential cooking skills from parents to youths.<sup>3,5</sup> Family cooking has become a means to an end, rather than a process for social connectedness, cultural expression, and life enhancement.<sup>1</sup> As youths gain autonomy in their transition to young adulthood, they often lack the skills necessary to complete basic food-related tasks.<sup>6</sup> Some believe that an emerging inability to prepare meals at home is predictive of poor dietary habits, contributing to childhood obesity.<sup>2</sup>

This commentary serves as an update on the call to incorporate culinary skills education in childhood obesity-prevention interventions. Food, nutrition, and dietetics practitioners should evaluate investments in culinary skills education approaches. This commentary addresses the question of why culinary skills education is important within the childhood obesity epidemic context, how effective culinary skills education interventions have been at modifying obesity-related risk behaviors, and how to design more

effective culinary skills education programs in the future by drawing upon peer influences.

## WHO IS LEADING THE CALL TO ACTION?

The launch of First Lady Michelle Obama's “Let's Move!” campaign in 2010 spurred a public and universal call for informed efforts to solve childhood obesity within one generation.<sup>7</sup> After the initiative's launch, a Presidential Memorandum was signed to create the Task Force on Childhood Obesity, which outlined 70 strategies to reduce childhood obesity by 5% by 2030.<sup>8</sup> This Task Force's report included an actionable recommendation to improve accessibility of healthy, affordable foods.<sup>8</sup> In response, key stakeholders noted that availability and accessibility of food would increase by teaching the skills necessary to select, handle, and prepare healthy foods.<sup>9</sup> This political agenda has generated a prominent invitation for culinary skills education to serve as a means to accomplish a specific health goal. The 2010 Dietary Guidelines for Americans support this call to action by encouraging strategies to “empower individuals and families with improved nutrition literacy, gardening and cooking skills to heighten their enjoyment of preparing and consuming healthy foods.”<sup>10</sup>

This health goal has generated a push for culinary skills education in public and private schools. Lichtenstein and Ludwig<sup>9</sup> advocated for the integration of cooking skills into secondary education curricula and suggested that if society could not rely on parents to teach children how to prepare nutritious meals, then children should be taught these skills in school. Lichtenstein and Ludwig<sup>9</sup> boldly stated that a culinary skills education curriculum could be “among the best investments society could make.”<sup>9</sup> Condrasky and Hegler<sup>2</sup> concurred and further noted that extension-based culinary skills education programs for youths could promote long-term health by giving individuals the knowledge and analytical skills needed to create nutritionally adequate meals. Food, nutrition, and dietetics practitioners have been encouraged to teach school-aged children how to apply nutrition principles through food preparation and cooking. Peregrin<sup>11</sup> suggested that an emphasis on “home economics” education would give food, nutrition, and dietetics practitioners an opportunity to be influential leaders in delivering culinary skills education to youths by fostering partnerships with family and consumer sciences educators, school foodservice directors, principals, school board administrators, and community leaders to expand their reach in school systems and extension services.

## WHY IS CULINARY SKILLS EDUCATION IMPORTANT?

While the call for culinary skills education among school-aged children has come from a variety of stakeholders, it is important to clearly evaluate and understand why food, nutrition, and dietetics practitioners should invest time, energy, and resources in culinary skills education programs. One consideration is that teaching youths how to cook can prevent childhood obesity.<sup>2,8,9</sup> When used to prepare meals at home, culinary knowledge and skills have been associated with increased intakes of fruits and vegetables,<sup>12-15</sup> whole grains,<sup>14,15</sup> fiber,<sup>12</sup> folate,<sup>12</sup> vitamin A,<sup>12</sup> and calcium.<sup>14,15</sup> However, there is a lack of scientific evidence documenting and explaining pathways by which culinary competency leads to sustainable dietary changes and, subsequently, how such dietary changes lower childhood obesity. Combining culinary skills with nutrition education can enhance cooking-related factors, such as knowledge, attitudes, self-efficacy, and outcome expectations, among other variables, which might be reinforced through application in school, at home, and in restaurants to solidify long-term, health-promoting behaviors associated with childhood obesity prevention.

Another consideration is that culinary skills education offers a unique opportunity for experiential learning.<sup>16</sup> Hands-on culinary skills education can foster nutrition-related behavior change by enabling youths to apply abstract nutrition concepts to concrete experiences with foods.<sup>2,16-18</sup> The Figure displays one example of how culinary skills education can give youths an opportunity to gain knowledge through experience, as modeled by Kolb's learning cycle.<sup>19</sup> The educational impact of culinary skills is maximized as students move from observational to experiential learning stages and as a variety of learners (identified in the Figure) engage in culinary concepts.<sup>20</sup> Teaching school-aged children how to cook can lead to the ultimate application of dietary recommendations because youths gain critical-thinking skills and technical proficiencies to implement dietary guidelines. Nutrition knowledge alone appears incomplete without experiential learning via interactions with food and cooking equipment.

Another justification is that acquisition of culinary skills as a strategy for childhood obesity prevention is consistent with socioecological models of obesity.<sup>21,22</sup> Socioecological models provide frameworks for understanding obesogenic behaviors. These models guide intervention and research efforts by characterizing multiple influences that impact behaviors across personal, social, physical, and macro-level environments.<sup>22</sup> In these frameworks, constant interactions between and among factors across different contexts ultimately shape behaviors. Pathways of change among and between these different contexts are supported by behavior change models, including Social Cognitive Theory.<sup>23</sup> This theory proposes that behavior change is mediated through personal and environmental variables that interact reciprocally.<sup>24</sup> Interventions that target interactions between the individual and environment, including culinary skills, support positive behavior change, such as making healthier food choices and implementing additional preparation methods.<sup>3</sup>

Culinary skills fit within models of childhood obesity as an individual-level factor, impacting eating behaviors through direct interaction with mediators of behavior change,

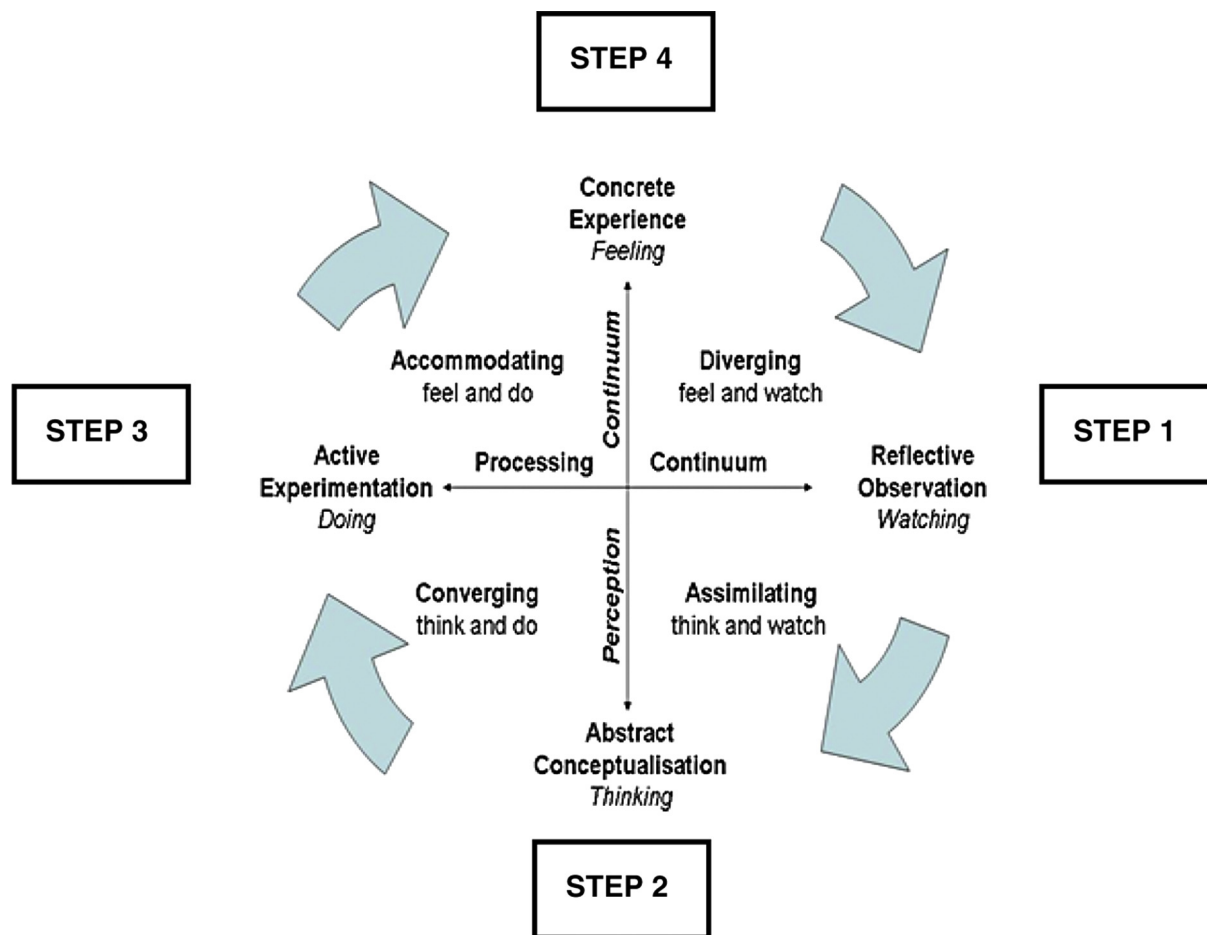
including availability and accessibility. In previous studies, visibility, accessibility, structure, and availability of food at home were shown to influence consumption patterns.<sup>25</sup> Declines in cooking skills can lead to low home availability and accessibility of nutrient-dense foods because individuals are bound by a lack of culinary skills and cooking confidence.<sup>26</sup> Parents purchase less-healthy convenience foods<sup>27,28</sup> requiring minimal preparation, which has been shown to adversely impact youths' ability to achieve dietary recommendations.<sup>29,30</sup> In support of this point, Larson and colleagues<sup>31</sup> found that individuals prepared less-formal meals at home because of a lack of knowledge about use of raw ingredients. Cooking knowledge is valuable because it helps individuals select and apply appropriate cooking methods to create healthier meals. Increasing culinary skills through changes in individual-level variables (eg, cooking self-efficacy and positive outcome expectations of cooking) and transfer of cooking skills from parent to child, serve to increase the capacity of the home environment to support positive changes in eating behaviors.

Other individual-level factors directly shape dietary behaviors in culinary skills education interventions. For example, Liquori and colleagues<sup>17</sup> documented that direct and repeated experiences with familiar foods impacted children's acceptance and preference patterns. In culinary skills education programs, exposure to healthy foods can be maximized through experiences of viewing, smelling, handling, and tasting of new and familiar foods, which can ultimately shape dietary intake as youths gain the motivation and behavioral capacity to choose and consume healthy foods.<sup>32</sup> Cooking attitudes can predict the maintenance of positive behavior changes.<sup>3</sup> As youths gain cooking skills and knowledge, their positive attitudes toward cooking may also increase because they might develop positive outcome expectations and a sense of accomplishment from successfully creating meals.<sup>3</sup>

Culinary skills education interventions appear to be a logical target for obesity prevention in youths because such skills impact both individual and environmental determinants of behavior. The ability to deliver these programs to school-aged children must be evaluated to assess the impact on childhood obesity prevention.

## HOW EFFECTIVE ARE CULINARY SKILLS EDUCATION PROGRAMS?

Limited studies have tested the effectiveness of culinary skills education interventions in modifying obesity-related risk behaviors in youths. An informal literature review of studies, using key search terms (ie, "culinary" OR "culinary skills" OR "culinary education" OR "cook" OR "cooking" AND "overweight" OR "obesity" OR "obese" AND "child" OR "children" OR "adolescent" OR "adolescence" OR "teen" OR "youth" [in various combinations]) entered into PubMed (Medline), PsycINFO, and AGRICOLA articles databases along with hand-selected abstracts and papers resulted in a total of 17 relevant publications pertaining to culinary skills education interventions in childhood and adolescence (ages 2 to 19 years).<sup>13,17,33-47</sup> Studies have assessed a variety of behavioral,<sup>13,17,33-43</sup> psychosocial,<sup>17,33,35,37-42</sup> process evaluation,<sup>13,17,38,39,44-46</sup> and anthropometric outcomes.<sup>34,37</sup> Two studies<sup>13,17</sup> have found that culinary skills education programs are feasible in home and school environments. These



**Figure.** Model of culinary skills education as a process for Kolb's cycle of experiential learning. Cycle of experiential learning from Kolb, David A. *Experiential Learning: Experience as a Source of Learning & Development*, 1st edition, ©1984. Reprinted by permission of Pearson Education, Inc, Upper Saddle River, NJ.

interventions have effectively captured the interest and excitement of participants.<sup>43-45</sup> Parents have reported being supportive of their children's involvement in such interventions and perceiving positive changes in their children after completion of programs.<sup>44,45</sup>

Anthropometric outcomes used to characterize obesity have not been adequately tested in culinary skills education programs. Davis and colleagues<sup>34</sup> found that culinary skills education led to substantial reductions in diastolic blood pressure, weight change, and body mass index percentile, and Fulkerson and colleagues<sup>37</sup> found no change in body mass index percentile among intervention children. Some studies found self-reported increases in post-intervention fruit and vegetable intakes<sup>36,38,45</sup> and pre-post changes in dietary fiber intake,<sup>34</sup> and other studies reported no changes in dietary habits among intervention participants.<sup>17,37,42</sup> Changes in cooking behaviors were consistently significant across most studies, including positive changes in preparation skills,<sup>37,47</sup> food safety behaviors,<sup>36</sup> and general cooking skills.<sup>35,44,45</sup> Many studies documented changes in cooking knowledge,<sup>17,35,39,45,47</sup> cooking self-efficacy,<sup>17,42</sup> preferences for fruits and vegetables,<sup>17,33,41</sup> perceived cooking abilities,<sup>35</sup>

behavioral intentions,<sup>35</sup> and awareness,<sup>38,45</sup> and other studies found no significant changes in knowledge,<sup>42</sup> self-efficacy,<sup>35,37</sup> outcome expectations,<sup>35</sup> attitudes towards cooking,<sup>17,35</sup> and cooking perceptions.<sup>35</sup> Although data on culinary skills education interventions in youths are limited, evidence does exist that supports the feasibility of programs and their ability to promote positive changes in cooking behaviors, psychosocial mediators, and physical outcomes related to obesity.

Study limitations dampen the degree to which culinary skills education programs have been delivered and evaluated. Ten studies have not included control groups,<sup>13,35,36,38-40,42,44,46,47</sup> making overarching conclusions about the effectiveness of these programs—compared with traditional nutrition-education programs—tenuous. Another key limitation has been the lack of follow-up data reported on changes in obesity-related outcomes. Only two studies included follow-up assessments and neither published assessment outcomes.<sup>37,38</sup> It is unclear whether behavior truly changes and for how long after completion of culinary skills education programs. Most studies have not included parents in these programs with their children.<sup>13,17,33-35,39-43,47</sup> Parents have

traditionally played key roles in modifying behavior change in the home environment, as gatekeepers of food and as role models for cooking skills and eating behaviors.<sup>43</sup>

A substantial gap in culinary skills education interventions is simply a lack of published data. Many articles describe outcome measures without supporting results or offer summaries of data found only in other unpublished documents. A number of studies<sup>38-42</sup> used as primary references for culinary skills education programs are abstracts that have not yet been transformed into peer-reviewed publications. There is a limited understanding of how well these interventions have been executed, largely because of the lack of systematic evaluation and publication. These key limitations provide a window of opportunity to improve efforts for modifying obesity-related risk behaviors through culinary skills education interventions.

### CAN PEERS ANSWER THE CALL FOR CULINARY SKILLS EDUCATION?

Food, nutrition, and dietetics practitioners have the tools for executing culinary skills education interventions in youth. Perhaps, however, future programs could utilize potentially more influential educators to transform behaviors. Interventions summarized in this commentary have used both individual and collaborative approaches to deliver culinary skills education. Some studies employed the use of one adult educator with a specific expertise,<sup>35-37,39-43,45-47</sup> and other studies used a team of adult experts with a range of skills.<sup>13,17,34,38,44</sup> The intrinsic difference between these approaches is the use of either one or multiple social role models. Social modeling mediates behavior change, as individuals observe the behaviors of others to form beliefs and attitudes about their own.<sup>48</sup> Potentially, culinary skills education interventions are minimally effective because such programs have not tapped into one of the most influential role models to serve as the educator—the peer. To date, no published culinary skills education interventions in youths have used same-aged peer educators to deliver programs.

Peer-education strategies involve the training of highly motivated individuals or groups to communicate health messages to peers within a similar group. Peers serve as influential models during adolescence because youths spend progressively more time with peers,<sup>49</sup> and these relationships ultimately lead to identify formation, whereby personal interests, values, goals, and commitments<sup>50</sup> are strongly impacted by the beliefs of similar peers.<sup>51</sup> In recent literature, these social networks have been associated with childhood obesity,<sup>52,53</sup> as peers within groups adopt similar behaviors.<sup>54</sup>

Peer models effectively initiate behavior change and skill development in others through the process of observational learning. Observational learning raises self-efficacy by increasing the belief that one can perform a task equally well.<sup>55</sup> Social norms and social support generated by peers in social networks are also robustly influential at modifying behaviors. Salvy and colleagues<sup>48</sup> reported that youths developed normative beliefs about nutrition based on nutrition-related behaviors of peers in the social network. Youths adopt behaviors that conform with peer behaviors as a means of solidifying their position within the social network. Youths are more likely to sustain healthy behaviors when peers empower them to feel confident performing

healthy tasks and to believe that positive health outcomes will result from successfully performing such tasks.<sup>56</sup>

Some current culinary skills education interventions acknowledge the importance of peers. Liquori and colleagues<sup>17</sup> suggested that food preferences and familiarity with healthy foods were enhanced through experiences with preparing and eating foods in a positive social affective context created through cooking lessons. Cooking in the presence of peers can increase food acceptance of, and preferences for, healthy foods, because school-aged children might enjoy experimenting in the kitchen with friends.<sup>43</sup> To create a positive social affective context, several culinary skills education interventions have delivered small group activities for students to interact more closely with their peers.<sup>17,34,35,47</sup> Peer educators can serve to create the ultimate environment, as youths are given the opportunity to interact with peers in knowledge acquisition and experimental stages of learning culinary concepts.

Cooking with peers also teaches students how to work together. Lukas and Cunningham-Sabo<sup>43</sup> found that teachers believed that cooking programs encouraged students to treat each other with respect and to hone social skills involved in teamwork. Similarly, Dougherty and Silver<sup>44</sup> reported that skill-building sessions generated camaraderie among students, as they encountered challenges and milestones together. Using peer educators can increase the likelihood that youths will master abstract cooking concepts, as youths grasp ideas in socially acceptable and relatable ways. As a broader socioecological influence, learning how to work together in the kitchen has positive implications for the home environment. Youths can use newly gained team-building skills to encourage their siblings to work together in meal preparation.

Peers directly impact intake of nutrient-dense foods by others through development of normative behaviors in cooking classes. Salvy and colleagues<sup>48</sup> demonstrated that people used eating behaviors of others as indicators of how to eat appropriately. Normative eating behaviors are particularly pertinent to current culinary skills education programs, many of which include food tastings in their curricula.<sup>17,37,41,43</sup> Tasting healthy foods becomes the norm as youths observe peers trying new foods. Peers also influence healthy consumption through impression management,<sup>48</sup> a model that predicts individual behavior based on control of impressions formed by others. Consuming certain types of foods associated with social status can be carried out to convey good impressions among peers.<sup>48</sup> As peer educators engage in trying new foods during tastings, school-aged children might be more motivated to try these foods in an attempt to uphold similar leadership status. Foods tasted in these lessons take on greater social meaning, perhaps serving to improve dietary behaviors and also strengthening the social network. Future interventions might be more effective at producing positive behavior changes when youths are empowered to teach culinary skills information to their fellow peers.

Effective culinary skills education can be delivered in traditional classroom settings, within the family, and in consumer sciences core courses; such cooking programs should be continued or reintroduced in schools.<sup>2,9</sup> For a potentially greater impact, programs should integrate culinary concepts across pre-existing school curricula, such as food variety and availability in social studies and edible portions and pricing in

mathematics and economics. In addition, culinary ambassadors could be nominated by peers and teachers to serve as leaders, teachers, and role models<sup>57</sup> for promoting culinary skills in classrooms and to school administrators and parents. After-school settings<sup>58</sup> might be best for in-depth peer-education programs to help youths apply culinary concepts in experiential cooking classes. Future research is critical to testing the feasibility, impact, and reach of school-based peer education programs related to culinary skills education.

## SUMMARY

Food, nutrition, and dietetics practitioners have been called upon to teach youths how to cook amid the current obesogenic food environment. Existing efforts to promote culinary skills education programs have been promising, yet goals of childhood obesity prevention rely on continued innovative and informed efforts. Evidence connecting culinary skills education interventions to childhood obesity prevention is needed. A grand opportunity exists to improve such programs. Training motivated youths to serve as peer educators is one approach. Peer education is a bold method toward culinary skills education because it places the responsibility of teaching basic cooking skills in the hands of youths who have less experience than any other generation at selecting and preparing healthy foods and meals. Peer-led culinary skills education can be an effective strategy for answering the call, as youth educators might be the most socially relevant agents for change. Peer-led programs can provide evidence for understanding the relationship between culinary applications and changes in dietary behaviors and can have the longest-lasting impact on behavior change because such programs might more optimally cater to the adolescent need for health-related information from socially relevant peers. Culinary skills education can be most effective when the learning starts with youths and spreads throughout the social network.

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## STATEMENT OF POTENTIAL CONFLICT OF INTEREST

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