Eating Competence of Hispanic Parents Is Associated with Attitudes and Behaviors That May Mediate Fruit and Vegetable-Related Behaviors of 4th Grade Youth

Barbara Lohse and Leslie Cunningham-Sabo

Abstract

Parent self-efficacy, outcome expectancies, and behaviors toward cooking and fruits and vegetables mediate children’s eating. Eating competence, an intra-individual approach to food-related attitudes and behaviors, is associated with healthful outcomes but has not been studied as a moderator of parent food-related behaviors that mediate healthful eating in 4th grade children. Parents (n = 339; 78% Hispanic, 89% female) of 4th graders who participated in an impact study of the Cooking with Kids curriculum in Santa Fe, NM schools eligible for Supplemental Nutrition Assistance Program Education completed the following surveys: Satter eating competence inventory for low-income (ecSI/LI) (16 items, Likert scale, possible score 0–48); modeling behaviors related to food preparation and fruits/vegetables (11 items, Likert scale, possible score 0–33); self-efficacy/outcome expectancies (SE/OE) (12 items, Likert scale, possible score 12–60); and availability of fruits/vegetables (20 items, possible score 0–20). Higher scores indicate more desired behaviors. The mean ecSI/LI score was 33.6 ± 8.5; 59% were eating competent, i.e., ecSI/LI ≥32. Eating-competent parents demonstrated more modeling (16.3 ± 5.0 vs. 14.0 ± 4.3; P < 0.001), greater SE/OE (53.7 ± 10.1 vs. 51.2 ± 8.5; P = 0.03), and greater in-home fruit/vegetable availability (12.7 ± 3.0 vs. 11.9 ± 3.2; P = 0.02). Two clusters of modeling behavior were defined: achievers and strivers. Achiever parents (34.9 ± 6.9) were more eating competent (P < 0.001) than strivers (30.3 ± 8.9).

Eating competence moderated parent food-related behaviors. Measuring eating competence may contribute to understanding parent behavior as a mediator in school-based nutrition interventions.

Introduction

The mediating moderating variable model (MMVM) provides a framework to examine how an intervention translates to behaviors that affect health outcomes (1–3). According to the MMVM, interventions produce outcomes by targeting a behavior (e.g., fruit and vegetable (FV) intake) that is strongly related to the outcome (e.g., nutrient density) through mediating variables (e.g., self-efficacy, home environment) that are associated with the behavior and subject to change. Moderating variables are factors (e.g., gender, ethnicity, parenting style) that influence outcomes through interactions with the intervention, mediating variables, and/or targeted behavior. Interventions designed to deliver healthful outcomes by increasing FV intake require identification of and validation that mediating and moderating factors affect targeted behaviors and their outcomes for specific audiences. Research to decrease childhood obesity or enhance dietary quality by increasing FV intake in school age children has identified parents’ behaviors and preferences as important mediators of behavior change (4–9). Ventura and Birch (10) reviewed the childhood obesity literature and found an evidence base for parenting influencing child eating (i.e., a mediating variable influencing a behavior) but not that parenting affected child weight through effects on child eating. Study of moderators of parenting attitudes and behaviors toward FV intake has been limited, which is concerning given the prominent role of moderating variables in the MMVM.

A plausible moderator of parent FV-related behaviors is parent eating competence status. Eating competence, as defined by the Satter model of eating competence model (ecSatter) is an intra-individual approach to eating and food-related attitudes...
Study design, participants, and outcome measures.

Participants and Methods

competence was a moderator of parents’ mediators, including experiences in the home; this assessment compared. Impact assessment revealed significant but uneven curricular effects that suggested influences from socio-ecological comparison. Children in schools assigned to either the full CWK cooking and tasting diverse foods using a multidisciplinary approach during an academic curriculum that integrates 16 h of cooking and tasting diverse foods a peer-reviewed (19), bilingual, classroom-based, hands-on (CWK) on 4th graders in Santa Fe, NM schools eligible for free and reduced lunch. Parenting behaviors related to self-efficacy/outcome expectancies (SE/OE), modeling, and preference of FV were among the practices examined to study the impact of Cooking with Kids (CWK) on 4th graders in Santa Fe, NM schools eligible for Supplemental Nutrition Assistance Program Education. CWK is a peer-reviewed (19), bilingual, classroom-based, hands-on curriculum that integrates 16 h of cooking and tasting diverse foods using a multidisciplinary approach during an academic year (20). Measures of student FV preference and self-efficacy for and attitude toward cooking (21) were compared among children in schools assigned to either the full CWK cooking and tasting experience, a tasting only component, or nontreatment comparison. Impact assessment revealed significant but uneven curricular effects that suggested influences from socio-ecological mediators, including experiences in the home; this assessment supported identification and examination of moderating variables (22). The purpose of this study was to determine if eating competence was a moderator of parents’ FV-related eating behaviors that mediate healthful eating in 4th grade children.

Participants and Methods

Study design, participants, and outcome measures. This descriptive, cross-sectional study included parents with 4th grade children enrolled during the 2008–2009 school year in a controlled study of the impact of CWK (22). Parent factors examined included: 1) modeling by eating meals and snacks with children; 2) perception of SE/OE related to preparing meals and FV that would be accepted by their children; 3) home availability of selected FV; 4) eating competence; and 5) the relationship of these factors to their child’s changes in FV preference and attitudes toward and self-efficacy for cooking. The schools involved were located in areas with large numbers of Hispanic, low-income residents, which suggested a sample with ethnic-driven food-related and parenting behaviors.

Data collection. Approximately 1 mo prior to completion of their child’s participation in CWK, surveys with a cover letter were sent home with 652 4th graders for their parents to complete. A standardized protocol was used (23) and a packet of birdseed was included as an incentive. Students were instructed to return the completed surveys to their teacher. The procedure was repeated if the first survey was not returned to the classroom within 2 wk. Study personnel collected returned surveys from each classroom. Surveys were offered in English and Spanish.

Surveys. Parent practices for eating with children and modeling FV intake were examined by questions of weekly frequency of preparing and eating meals with their child (24) and an 11-item modeling survey modified from Cullen (25). Each item referenced an eating event and the inclusion of either a fruit or a vegetable, e.g.: How often do you eat breakfast with your child? How often do you eat vegetables at dinner with your child? Based on a scale originally developed for children, each modeling item had 4 response options for each item: never (0 d), sometimes (1–3 d), often (4–6 d), and always (7 d); thus, item scores ranged from 0 to 3 and possible scores ranged from 0 to 33.

Parent-perceived ability to prepare and offer FV that their children would eat (i.e., self-efficacy and outcome expectancies, respectively) was measured with 12 items derived from tested measures of parent self-efficacy and expectancies (26) scaled from 1 (strongly disagree) to 5 (strongly agree); thus, possible scores ranged from 0 to 60. Sample items included: If I buy fruit, my child will eat it (outcome expectancy); I can prepare vegetables (self-efficacy) that my child will like (outcome expectancy).

In-home FV availability (as fresh, frozen, canned, or dried) during the previous week for 8 fruits, 9 vegetables, and 3 100% fruit juices was either confirmed or denied or possible. Tally scores ranged from 0 to 20. Self-reported shelf inventory has been shown to be a validated measure of food availability (28).

Parenting competence was measured with the Satter eating competence inventory for low-income audiences (ecSI/LI), a validated, 16-item instrument (15,16) scored from 0 to 3 (never/rarely to always) forming 4 subscales: internal regulation skills, food acceptance, eating attitudes, and contextual skills. ecSI/LI scores range from 0 to 48 with possible subscale scores of 0 to 9 (internal regulation and food acceptance) and 0 to 15 (eating attitudes and contextual skills). Translation of the ecSI/LI from English into Spanish involved native speaking, regional translators, and back translation by 2 geographically diverse nutrition educators. The Colorado State University Institutional Review Board approved this project, assigning expedited status to the parent survey component and exempt status to the student component.

Statistical analysis. Data were analyzed with SPSS (version 18.0.0, 2009). For each scale, item responses were summed to create a scale score, with higher scores on the parent scales indicating preferred practice and lower scores on the student scales suggesting desired outcomes. Parent modeling, SE/OE, and in-home FV availability results were categorized as below the median or at or above the median. Eating competence was defined as an ecSI/LI score ≥32 (15). Eating competence was also categorized into high, medium, and low ecSI/LI score tertiles. Internal consistency for all surveys was assessed with Cronbach’s α. Differences between ecSI/LI completers and noncompleters, between eating-competent and noneating-competent parents, median based-categories of parent outcome measures, and student survey results of responding compared with nonresponding parents were assessed with t test and ANOVA (continuous variables) and chi square (categorical variables). Parent behaviors were assessed near the end of the CWK intervention; therefore, comparisons with eating competence status also employed a general linear model that included student intervention assignment and eating competence score tertile comparisons included parent educational attainment in the analyses. The study power to detect a difference (of either 4 points on self-efficacy scale, 2 points on modeling scale, or 2 types of FV) between eating-competent and non-eating-competent parents was 0.9. General linear model results are reported as estimated marginal means ± SE.

Cluster analyses were performed to identify relatively homogeneous subgroups within the sample (29). Independence among variables was confirmed (r = 0.51) before being entered into the analysis. Two-step cluster analysis was used combining sequential and hierarchical agglomerative methods preclustering and then subclustering data. The log-likelihood measure was used as a distance measure. The number of clusters was determined by automated cluster selection based on the largest relative increase in distance between the 2 closest clusters defined by the Schwarz Bayesian Criterion (30). All continuous variables were standardized and missing cases were deleted on a list-wise basis. Individuals who did not fit into any cluster were identified as outliers. Chi-square and t tests were used to test for differences between clusters (independent variable) on parent and child demographic characteristics.
TABLE 1 Characteristics of parents of 4th grade participants in CWK impact assessment

<table>
<thead>
<tr>
<th>Variable</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>293 (89)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>47 (14)</td>
</tr>
<tr>
<td>American Indian</td>
<td>4 (1)</td>
</tr>
<tr>
<td>Black</td>
<td>6 (2)</td>
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<tr>
<td>Asian/Other</td>
<td>9 (3)</td>
</tr>
<tr>
<td>Multi-racial/ethnicity</td>
<td>7 (2)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>255 (78)</td>
</tr>
<tr>
<td>Language</td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>218 (65)</td>
</tr>
<tr>
<td>Spanish</td>
<td>119 (35)</td>
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<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>28 (8)</td>
</tr>
<tr>
<td>Some high school</td>
<td>47 (15)</td>
</tr>
<tr>
<td>High school/diploma/GED</td>
<td>91 (28)</td>
</tr>
<tr>
<td>Some college/2 y college degree</td>
<td>101 (31)</td>
</tr>
<tr>
<td>4 y college degree/graduate school</td>
<td>58 (18)</td>
</tr>
<tr>
<td>Plans/prepares meals</td>
<td>289 (89)</td>
</tr>
<tr>
<td>Parent reports eating dinner with child</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>4 (1)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>29 (9)</td>
</tr>
<tr>
<td>Often</td>
<td>94 (28)</td>
</tr>
<tr>
<td>Always</td>
<td>204 (62)</td>
</tr>
<tr>
<td>Parent reports preparing meals with child</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>61 (19)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>188 (57)</td>
</tr>
<tr>
<td>Often</td>
<td>52 (15)</td>
</tr>
<tr>
<td>Always</td>
<td>29 (9)</td>
</tr>
<tr>
<td>Prepares food at home</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>18 (6)</td>
</tr>
<tr>
<td>Few times</td>
<td>93 (44)</td>
</tr>
<tr>
<td>Often</td>
<td>102 (48)</td>
</tr>
<tr>
<td>ecSI/LI score</td>
<td>33.6 ± 8.5</td>
</tr>
<tr>
<td>Subscales</td>
<td></td>
</tr>
<tr>
<td>Eating attitudes</td>
<td>11.8 ± 3.0</td>
</tr>
<tr>
<td>Food acceptance</td>
<td>4.7 ± 2.2</td>
</tr>
<tr>
<td>Internal regulation</td>
<td>6.9 ± 2.0</td>
</tr>
<tr>
<td>Contextual skills</td>
<td>10.3 ± 3.4</td>
</tr>
<tr>
<td>SE/OE score</td>
<td>52.8 ± 9.3</td>
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<tr>
<td>Modeling</td>
<td>15.3 ± 4.8</td>
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<tr>
<td>Fruits available</td>
<td>4.7 ± 1.8</td>
</tr>
<tr>
<td>Vegetables available</td>
<td>6.1 ± 1.8</td>
</tr>
<tr>
<td>Juice available</td>
<td>1.4 ± 0.9</td>
</tr>
<tr>
<td>Total available</td>
<td>12.2 ± 3.5</td>
</tr>
</tbody>
</table>

1 Values are n (%) or mean ± SD, total n = 339, although n varies throughout the tables because of missing or incomplete responses ranging from 211 to 337 when not 339. CWK, Cooking with Kids; ecSI/LI, Satter eating competence inventory for low-income; FV, fruit and vegetable; SE/OE, self-efficacy/outcome expectancy.
2 ecSI/LI possible score 0–48; possible subscale scores: eating attitudes and contextual skills, 0–15; food acceptance and internal regulation, 0–9.

and CWK intervention group as well as the variables used to derive the identified clusters (dependent variables). Clusters delineating modeling behaviors were validated against ecSI/LI scores. The level of significance was set at P < 0.05.

Results

Responding parents (n = 339; 54% response rate) were mostly Hispanic females with some post-high school education (Table 1). Grandparents with a caregiving role also completed the survey, because age ranged from 22 to 73 y (mean 37.2 ± 7.7 y). Responding parents were not highly involved with any school-based cooking experience, because only 46 had volunteered to help in CWK classroom cooking activities. Children of responding parents were less likely to be male (45 vs. 57%; P = 0.004) and had higher self-efficacy toward food preparation at baseline (P < 0.001) than children whose parents did not complete the survey. Baseline attitude toward and preference for FV or self-reported cooking experience did not differ between children of responding and nonresponding parents. Although child participation in treatment vs. comparison classes did not differ between responder and nonresponder parents, of the children participating in a CWK intervention, parent nonresponse was greater (P = 0.003) for children in the cooking and tasting (36%) than the tasting only groups (39%).

Parents not completing the ecSI/LI (n = 30) did not differ from ecSI/LI completers on most demographic measures. ecSI/LI noncompleters were more likely to complete surveys in Spanish (P = 0.012), with 57% (n = 16) using Spanish survey versions compared with only 33% (n = 103) of the ecSI/LI completers.

Of the 309 completing the ecSI/LI, 59% (n = 182) were eating competent. Parent eating competence was not related to gender or volunteering to help in CWK cooking classes or their child’s intervention group assignment. In addition, being eating competent was not associated with Hispanic ethnicity; 65% of non-Hispanic parents were eating competent compared to 57% of those of Hispanic ethnicity. Mean ecSI/LI scores were not significantly different between Hispanic (33.2 ± 8.5; n = 234) and non-Hispanic parents (34.7 ± 8.5; n = 75) or between males (31.9 ± 7.5; n = 34) and females (33.7 ± 8.6; n = 271). Age was not related to ecSI/LI scores (total or subscales). ecSI/LI total score and 3 subscale scores of parents completing a Spanish language survey did not differ from parents completing the English version; ecSI/LI Food acceptance subscale scores were lower (P = 0.024) for parents (n = 113) completing the Spanish version (3.1 ± 2.1 vs. 4.3 ± 2.3).

Internal consistency was evident for all measures; Cronbach’s α was 0.84 for modeling, 0.96 for SE/OE, and 0.89 for ecSI/LI.

Comparisons between eating competent and non-eating–competent parents. Modeling behaviors related to meals and FV intake were higher (P < 0.001) in eating-competent (16.3 ± 5.0) than in non-eating–competent parents (14.0 ± 4.3). In addition, eating competence was globally associated with modeling in that all 11 modeling behaviors were practiced with greater

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3 SE/OE survey; possible score 12–60.
4 Survey of modeling mealtime and FV-related behaviors; possible score 0–3.
5 Number of fruits available in the home; possible range 0–8.
6 Number of vegetables available in the home; possible range 0–9.
7 Number of juices available in the home; possible range 0–3.
8 Fruits, vegetables, and fruit juices summed; possible range 0–20.
frequency by eating-competent parents (all \( P \leq 0.04 \)). Responses about frequency of eating breakfast or dinner with their child, preparing meals together, and eating vegetables or fruit at dinner are compared between eating-competent and non-eating-competent parents in Figure 1. Modeling remained greater \( (P < 0.001) \) in eating-competent \( (16.2 \pm 0.39) \) than in non-eating-competent \( (13.8 \pm 0.48) \) parents when children’s intervention group assignment was included in the general linear model.

Eating-competent parents reported greater \( (P = 0.032) \) SE/OE related to FV preparation and consumption. Differences were significant for 6 of the 12 survey items (Table 2) and tended toward significance for 3 more; eating-competent parents tended to agree more strongly than non-eating-competent parents that they could prepare vegetables their child would like \( (P = 0.09) \), buy vegetables their child would eat \( (P = 0.06) \), and include vegetables that would be consumed by their child in a meal \( (P = 0.05) \). As a whole, more fruits, vegetables, and 100% fruit juices were available in homes of eating-competent \( (12.7 \pm 3.0; n = 182) \) than non-eating-competent parents \( (11.9 \pm 3.2; n = 127) \) \( (P = 0.024) \). When examined separately from fruits, vegetables were more available in the homes of eating-competent \( (6.4 \pm 1.6; n = 182) \) than non-eating-competent parents \( (5.9 \pm 1.7; n = 127) \) \( (P = 0.009) \). Parent SE/OE and modeling responses did not significantly differ among assigned child intervention groups; parents of students in the cooking and tasting group tended \( (P = 0.054) \) toward greater FV availability than those with children in the tasting only and comparison groups.

Comparisons among parents according to eating competence tertile. Tertiles based on ecSI/LI scores differed only by postsecondary education \( (P = 0.01) \). Among ecSI/LI tertiles, more low ecSI/LI tertile parents had a high school diploma or less \( (59 \text{ vs. } 48\% \text{, middle, and } 38\% \text{, high}) \). Parent modeling, SE/OE, and in-home FV availability also differed among ecSI/LI tertiles (data not shown; all \( P \leq 0.014 \)). Tertile differences remained significant for all measures when education level was included in the analyses. Post hoc Scheffé tests revealed parents in the high ecSI/LI tertile reported significantly more modeling behaviors and in-home FV availability than parents in the middle and lowest tertiles; parent SE/OE in the lowest ecSI/LI tertile were significantly lower than parents in the middle tertile.

ecSI/LI scores and subscale scores were compared between parents scoring less than the median and those at or higher than the median for role modeling, SE/OE, and in-home FV availability. As shown in Supplemental Table 1, ecSI/LI and subscale scores were significantly higher for parents at or above the median score of nearly all surveys.

Modeling behavior clusters. Cluster analysis of parental food and eating behaviors delineated 2 clusters (average silhouette was 0.4, fair quality) for 274 parents. The discriminant function as a whole was significant \( (\text{Wilks’ } \lambda = 0.21; P < 0.001; \eta^2 = 0.79) \). Derivation variables are shown in Table 3. Clusters were differentiated most by responses to frequency of consuming dinner with their child, then by summed score to the modeling items. Modeling achievers \( (n = 167) \) made more FV available to their children, more frequently ate breakfast, and always ate dinner with their children. In contrast, modeling strivers \( (n = 107) \) ate breakfast and dinner less often with their children and had the fewest FV available in the home. Student gender, ethnicity, and assigned intervention were not associated with any specific cluster. As anticipated, parent ecSI/LI score was significantly higher with modeling achievement, validating cluster derivation.

**Discussion**

This study measured FV-related modeling behaviors, SE/OE toward FV, and in-home FV availability for parents of 4th grade...
children participating in a controlled study of the impact of CWK (a classroom-based curriculum) on student FV preference, attitude toward cooking, and self-efficacy related to cooking and FV. Aligning with MMVM (1) depicts CWK as the intervention, student FV preferences, attitude toward cooking, and related SE as behaviors mediated by parent behaviors to achieve health. The results identified eating competence as a moderating influence on parent modeling behaviors, SE/OE toward FV, and in-home availability of FV. Eating-competent parents were stronger models of healthful eating behavior (including those related to FV), demonstrated greater SE/OE toward cooking and FV, and had a greater variety of FV available in the home. These findings contribute evidence affirming construct validity for SE/OE toward FV, and had a greater variety of FV available in the home. These findings contribute evidence affirming construct validity for SE/OE toward cooking and related SE as behaviors mediated by parent behaviors to achieve health. However, more than three-fourths of this sample was Hispanic and one-third completed the Spanish version of the ecSI/LI. Earlier construct validation studies included only 3.4 and 6% Hispanics (15,16) and did not portend the ecSI/LI findings in this sample, because ecSI/LI scores were similar between Hispanics and non-Hispanics. The mean eating competence score of Hispanics in the 2007 validation study (15) was 32.2, which is similar to the mean ecSI/LI score of 33.2 ± 8.6 for the 240 Hispanic parents in this sample. However, the mean ecSI/LI score of the 31 Hispanics in the 2011 validation study was 8.9, which is similar to the mean ecSI/LI score of 15 Hispanic and one-third completed the Spanish version of the ecSI/LI. Earlier construct validation studies included only 3.4 and 6% Hispanics (15,16) and did not portend the ecSI/LI findings in this sample, because ecSI/LI scores were similar between Hispanics and non-Hispanics. The mean eating competence score of Hispanics in the 2007 validation study (15) was 32.2 ± 8.9, which is similar to the mean ecSI/LI score of 33.2 ± 8.6 for the 240 Hispanic parents in this sample. However, the mean ecSI/LI score of the 31 Hispanics in the 2011 validation study was 8.9, which is similar to the mean ecSI/LI score of 15

| TABLE 3 Behaviors compared between parents in achiever and striver modeling clusters¹ |
|-----------------|-----------------|-----------------|-----------------|
|                 | Achiever/striver | Modeling achiever | Modeling striver | Effect size **²** |
|                 | n/n              |                  |                  |                  |
| Eats dinner with child² | 167/107 | 3.0 ± 0.0***    | 1.8 ± 0.5      | 0.79             |
| Eats breakfast with child² | 167/107 | 1.4 ± 0.7***    | 1.0 ± 0.7      | 0.07             |
| Modeling score³ | 167/107 | 17.3 ± 4.5***   | 12.3 ± 3.5     | 0.26             |
| SE/OE score⁴   | 167/107 | 54.3 ± 8.5**    | 51.5 ± 8.0     | 0.03             |
| Available FV⁵   | 167/107 | 13.1 ± 2.9***   | 11.1 ± 3.4     | 0.09             |
| ecSI/LI score⁶  | 153/98  | 34.9 ± 7.8***   | 30.3 ± 8.9     | 0.07             |
| ecSI/LI subscales⁷ |       |                  |                  |                  |
| Eating attitudes | 160/105 | 12.1 ± 2.6**    | 11.1 ± 3.2     | 0.03             |
| Food acceptance  | 163/103 | 4.9 ± 2.1***    | 4.0 ± 2.2      | 0.05             |
| Internal regulation | 166/104 | 7.0 ± 1.9**    | 6.3 ± 2.1      | 0.03             |
| Contextual skills | 162/103 | 10.7 ± 3.2**    | 9.3 ± 3.8      | 0.03             |

¹ Values are means ± SD. Asterisks indicate different from striver parents: *P < 0.05, **P ≤ 0.01, ***P ≤ 0.001. EC, eating competent; ecSI/LI, Satter eating competence inventory for low-income.
² Possible responses were never (0), sometimes (1), often (2), and always (3).
³ Modeling survey possible score 0–33.
⁴ SE/OE possible score 12–60.
⁵ Number of FV available in the home possible range 0–20.
⁶ ecSI/LI possible score 0–48.
⁷ Possible subscale scores: contextual skills and eating attitudes, 0–15; food acceptance and internal regulation, 0–9.
validation study (16) was only 28.2 ± 12.4 and the eating competence score of elderly Spaniards (measured with a survey translated specifically for Spaniards) was 30.9 ± 6.3 (12), suggesting further study of Hispanic eating competence is warranted. Indeed, the potential of Hispanic ethnicity to moderate parent eating and food-related behaviors appears not to be a constant but rather a function of acculturation, country of origin, and income (33,34).

Nonetheless, the large proportion of Hispanics in this sample cautions against generalization to samples with dissimilar ethnicity. Although the parent response rate was good, with few child-driven differences between responding and nonresponding parents, translating findings into practice may be limited, because parent surveys were administered near the end of the CWK impact study, leading to speculation that child participation in the academic yearlong program may have influenced parent survey responses. However, nonsignificant differences across impact study groups suggest that timing did not invalidate parent FV behaviors as a mediating variable. Also, in addition to parent acculturation status, biopsychosocial measures and parenting styles were not collected, thereby limiting the scope of the analyses. For example, weight status, cognitive eating behaviors (e.g., emotional eating, restrained eating), food management practices (e.g., budget management), and economic pressures are not reported and all are known correlates of eating competence. The relationship of parenting style to eating competence has not been studied but appears warranted, because eating-competent parents had greater FV availability and a higher FV availability in the home may be related to parenting style (35). Finally, Johnston et al. (36), in their study of Mexican American youth, identified reliance on self-reported data as limiting, because they did not identify the significant findings apparent from observation-driven data. Findings from this study rely on self-reports and thus carry the associated limitations. The investigation of eating competence as a moderator would benefit from the additional development of instruments and scoring schemata, including criterion and observational validation.

In conclusion, the MMVM is a scaffold to organize the competing, complex, and dynamic factors that confound intervention impact assessment and in short, promotes nutrition education engineering. Documenting moderation of the mediators of behavior will inform intervention development and evaluation design. Baranowski (1) notes that “intervention procedures should . . . minimize moderating variable differences or different procedures need to be used for different levels of the moderator.” Eating competence is a health behavior construct with a systems level bio-behavioral scope and has been shown to be a moderator of parent eating and FV-related behaviors. Assessment and, possibly, equilibration of eating competence is a compelling option to realize sound intervention impact assessment.

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Literature Cited


