RELATIONSHIP OF EATING COMPETENCE TO FOOD AND EATING BEHAVIORS IN A PREDOMINANTLY HISPANIC SAMPLE OF 4TH GRADE PARENTS IS CONFIRMED IN A PREDOMINANTLY NON-HISPANIC WHITE SAMPLE OF 4TH GRADE PARENTS

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Abstract

Purpose: Eating competence (EC) was associated with parent practices supportive of child obesity prevention in a mostly Hispanic sample. This study sought to confirm findings in a mostly non-Hispanic white sample.
Methods: Data were collected at baseline from 2 cohorts of parents in consecutive years whose 4th grade children participated in a classroom-based cooking program. Parents (n=215) responded to an online survey that included the Satter Eating Competence Inventory 2.0 (ecSI 2.0), fruit and vegetable-based modeling practices, self-efficacy/outcome expectancy (SE/OE) and fruit/vegetable availability (FVA) in the home; height/weight were self-reported. Survey response options were summed for analyses that included correlation, means testing, and cluster analysis.
Results: Parents were mostly non-Hispanic white (91%), female (87%), college educated (66%) with a mean age of 39.6 ± 5.9 y; only 18% were obese. 54% were eating competent (EC) (ecSI 2.0 score ≥ 32); mean ecSI 2.0 score of 31.8 ± 8.0 did not differ by gender. Past or current nutrition assistance program use was 17% SNAP, 21% WIC, 15% food banks. Although healthy, 20% self-identified as under extreme stress and 50% had either used a nutrition assistance program or worried about money for food. EC parents had greater FVA (12.3 ± 2.5 vs 11.5 ± 2.8, P = 0.04). SE/OE was significantly higher in EC parents (55.0 ± 6.5 vs 52.3 ± 8.4, P=0.013). EC parents more strongly agreed that they could buy and serve vegetables that their child would eat (all P < 0.04). Parent modeling of obesity preventive eating behaviors was significantly greater in EC than non-EC parents (P < .001). EC parents were more likely to eat dinner with their child and include vegetables with meals (all P < 0.03). Cluster analysis identified 2 clusters - Achievers (n=155) and Strivers (n=53). Achievers demonstrated greater food resource management skills (e.g., planning meals, comparing prices, money management confidence, considering nutrition in purchases; all P ≤ 0.03). Achiever ecSI 2.0 scores were significantly higher (33.2 ± 7.1 vs 27.8 ± 8.5; P < 0.001).
Conclusions: Association of EC with obesity preventive food related practices in both Hispanic and non-Hispanic white parents endorses parent nutrition education focused on EC concepts.

Background

In an earlier study of mostly Hispanic parents of 4th graders attending schools eligible for SNAP-Ed, eating competence (EC) as measured by the Satter Eating Competence Inventory (ecSI 2.0) [1–3] was related to parent modeling behaviors and self-efficacy to prepare and serve fruits and vegetables to their child(ren). [4] **The purpose of this study was to confirm these findings in a mostly non-Hispanic, but otherwise similar sample of 4th grade parents.**

Methods

Data Collection. Teachers of 4th graders participating in 2 consecutive chorts of *Fuel for Fun*, a school-based cooking and activity experience that included Cooking with Kids, [5–6] provided students with take-home flyers that included a URL to an online survey. Parents completed the survey in one sitting at home. Data were collected using Qualtrics (Provo, UT) and downloaded to SPSS (21.0, 2012; Armonk, NY). The study was approved by the Colorado and Pennsylvania State Universities' IRB.

Instruments

Target Measurement	Instruments	Description
Eating Competence	Satter Eating Competence Inventory[1] (ecSI 2.0)	16 items, 5 response options scored from 3 to 0. Possible score 0 - 48; scores ≥ 32 indicate eating competence. Cronbach α 0.89.
Modeling Eating Behavior	Modeling Scale. Sample items: How often do you eat dinner with your child? How often do you eat vegetables at dinner with your child?	11 items modified from original scale, [7] each with 4 response options. Possible scores 0 - 33. Cronbach α 0.77.
Self-efficacy/Outcome expectancies	Perceived ability to offer fruits and vegetables that their child will eat. Sample item: I can prepare vegetables that my child will like	12 items modified from tested measure [8] each with 5 response options. Possible scores 12 - 60. Cronbach α 0.93.
In-home Fruit and Vegetable Availability	Fruit and Vegetable Availability Inventory [9, 10]	20 items (fresh, frozen, canned fruits, vegetables and 100% juices) listed. Availability was affirmed or denied. Possible scores 0 - 20.
Physical Activity Level	International Physical Activity Questionnaire (IPAQ)[11]	Responses converted to met min/week and identified as low, moderate, and vigorous activity categories.
Parenting Style	Caregiver's Feeding Style Questionnaire[12]	19 items, 5 response options. Scores converted to 4 caregiver feeding styles.
Parent Perceived Stress	Single item from the Community Health Database [13]	Visual analog scale from 0 (no stress) to 10 (extreme stress).

Data Analysis

Data were assessed for normal distribution and analyzed using Pearson r, Spearman rho, ANOVA, independent t-test, Chi Square, Mann-Whitney U as appropriate. For each scale, item responses were summed to create a scale score, with higher scores indicating preferred practice. Parent modeling, SE/OE, and in-home FV availability results were also categorized as below the median or at or above the median. Eating competence was defined as an ecSI 2.0 score ≥ 32. [1] Internal consistency for all surveys was assessed with Cronbach's α. Power to detect a difference (of either 4 points on SE/OE scale, 2 points on modeling scale, or 2 types of FV) between EC and not EC parents was 0.9.

A 2-step cluster analysis was conducted after confirming independence among variables (all r < 0.44). 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. All continuous variables were standardized and missing cases were deleted on a list-wise basis.
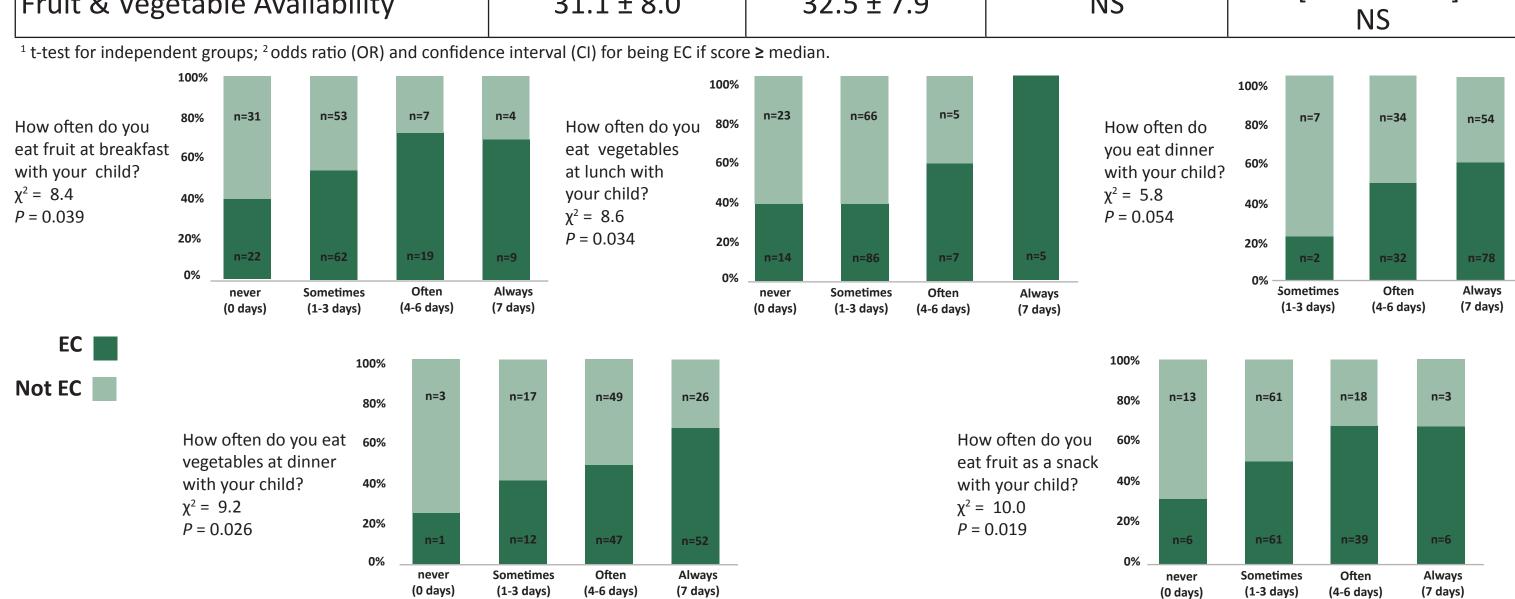
Individuals who did not fit into any cluster were identified as outliers. Differences between clusters on parent demographic characteristics were assessed with independent t-tests, Mann-Whitney U and Chi Square. Clusters were validated against ecSI 2.0 scores. The level of significance was set at P < 0.05.

Results

Participants

Participants (n=215) were mostly **female** (87%), **non-Hispanic white** (91%; Asian 5%), **educated** (66% 4-year degree or higher), **healthy** (5% diabetic) with **small families** (88% had 3 or fewer children), but feeling **stressed**. Although not recruited as a low-income sample, some food insecurity was evident (38% sometimes, often, or always worried about money for food; **food pantry use 15%; SNAP - 17%; WIC - 21%**); Income tested assistance program participation was reported by 30% and more than half of these parents used 2 or more programs.

Parents were respondents from a pool of 762 children (49% female; mean age 116.3 ± 5.4 months; measured BMI z-score .24 ± 1.1 range -3.0 to 2.6). Among all measures between children with non-responding and responding parents, only BMI z-scores significantly differed. BMI was greater for children with non-responding parents (.29 ± 1.10 vs .07 ± 1.0 P = 0.011).

Age	39.6 ± 5.9 y	range 25 - 64 y
BMI	25.8 ± 5.7	range 17.0 - 47.4
	3% underweight; 52% normal weight	
	27% overweight; 18% obese	

Eating Competence ecSI.20 31.8 ± 8.0
range 9 – 48
54% EC

Note: EC did not differ between school districts, child gender, cohort or among schools.

Results

Parenting style:	
Uninvolved	17%
Indulgent	29%
Authoritarian	30%
Authoritative	24%

Perceived Stress:	6.7 ± 2.1
	16% scored < 5
	20% scored of 9 or 10

EC Subscales:		
Eating Attitudes	10.5 ± 2.9;	range 0 - 15
Contextual Skills	10.2 ± 2.9;	2 - 15
Internal Regulation	6.2 ± 2.1;	0 - 9
Food Acceptance	5.0 ± 2.0;	range 0 - 9

Physical Activity:	
Self--perceive being physically active	70%
Self--perceive being physically active 30 minutes or more each day	64%

IPAQ Activity Level:	
Low	20%
Medium	28%
High	47%

Modeling Child Obesity prevention behaviors	15.1 ± 4.1	range 2 - 30 median 15.0
Self-efficacy/Outcome expectancies	53.7 ± 7.6	range 12 - 60 median 57.0
Fruit and Vegetable Availablity	12.0 ± 2.6	range 4 - 18 median 12.0

✓ **Previously defined tenets of EC were upheld.**
- ecSI scores were **higher for normal weight** than overweight and obese parents (P = 0.003)
- ecSI scores were higher for **lower BMI** (r = -.25; P < 0.001)
- ecSI scores were higher for persons who self-perceived being **physically active** (33.5 ± 7.5 vs. 28.3 ± 7.9; P = 0.003)
- ecSI scores were higher for those with higher levels of physical activity (34.2 ± 7.5 vs. 30.3 ± 7.7 vs. 29.6 ± 8.2 for high, moderate, and low respectively; P < 0.001)
- Competent eaters more frequently practiced **food resource management skills** (all P ≤ 0.001):
  - planned meals ahead of time and felt confident to manage money to make healthful food available
  - considered nutrition when deciding what to eat and planned meals to include all food groups
- Eating Competence was significantly correlated with **modeling behavior** (rho=.31; P < 0.001), **SE/OE** (rho=.23; P=0.001) and **FV availability** (r=.14; P=.04)

✓ **Competent eaters exhibited more modeling behaviors and had higher SE/OE and greater FV availability. Differences remained significant when controlling for use of assistance programs and worry about money for food.**

	Eating Competent?		
Measure	**Yes**	**No**	**Significance**
Fruit & Vegetable Availability	12.3 ± 2.5	11.5 ± 2.8	P < 0.04 [1]
Modeling Behavior	16.1 ± 4.0	13.9 ± 4.1	P < 0.001 [2]
Self-efficacy/Outcome expectancies	55.0 ± 6.5	52.3 ± 8.4	P < 0.013 [2]

[1] t-test for independent groups [2] Mann-Whitney U

✓ **ecSI 2.0 scores were higher for parents with modeling and SE/OE scores at or above the median.**

	ecSI 2.0 score			
Measure	**< Median**	**≥ Median**	**Significance [1]**	**OR [CI] [2]**
Modeling Behavior	29.3 ± 8.3	33.6 ± 7.2	P < 0.001	2.51 [1.16 - 2.09] P = 0.002
Self-efficacy/Outcome expectancies	30.6 ± 7.5	33.4 ± 8.0	P < 0.012	1.78 [1.02 – 3.10] P = 0.043
Fruit & Vegetable Availability	31.1 ± 8.0	32.5 ± 7.9	NS	1.44 [0.83 – 2.51] NS

[1] t-test for independent groups; [2] odds ratio (OR) and confidence interval (CI) for being EC if score ≥ median.

Legend: EC / Not EC

✓ **Cluster Analyses**

Modeling, SE/OE, and FV Availability survey scores clustered into two groups with a fair silhouette of cohesion and separation (0.5): Achievers of and Strivers for child obesity prevention practices. SE/OE was the greatest predictor of cluster membership. Although Achievers and Strivers did not differ in WIC or SNAP participation, BMI, Physical Activity level, or worry about money for food, Achievers scored significantly higher on modeling, SE/OE, FV Availability, and ecSI 2.0 surveys. In addition, Achievers had a lower proportion of authoritarian parents than Strivers.

Measurement	Achievers (n=155)	Strivers (n=53)	Statistic P
	Mean ± SD		
SE/OE	56.9 ± 3.8	43.1 ± 7.6	P < 0.001 [1]
Modeling	16.3 ± 3.4	10.9 ± 3.6	P < 0.001 [1]
FV Availability	12.5 ± 2.3	10.0 ± 2.6	t = 6.4 P < 0.001
ecSI 2.0	33.2 ± 7.1	27.5 ± 8.5	t = 4.6 P < 0.001
BMI	25.7 ± 5.6	26.1 ± 5.8	NS
Age (y)	39.4 ± 5.9	40.4 ± 5.4	NS
	%		
EC (ecSI ≥ 32)	61	32	χ^2 = 11.8 P = 0.001
WIC Participant	23	15	NS
SNAP Participant	16	17	NS
Physical Activity:			
High	48	38	
Moderate	28	33	NS
Low	24	29	
Parenting Style:			
Uninvolved	19	11	χ^2 = 8.1
Indulgent	33	18	P = .043
Authoritarian	26	44	
Authoritative	22	27	

[1] Mann-Whitney U

Conclusions & Implications

1. Tenets of healthful eating and lifestyle behaviors associated with being eating competent were supported.
2. Eating competent parents more frequently practiced behaviors associated with child obesity prevention.
3. Findings in a prior sample of mostly Hispanic parents were replicated in this sample of mostly non-Hispanic white parents, endorsing allocating resources to parent nutrition education focused on eating competence concepts.

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