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Child Compared with Parent Perceptions of Child-Level Food Security

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ABSTRACT

Background: There is a need to directly and accurately conceptualize and measure food insecurity in children as part of surveillance and public health efforts.

Objective: The aim of this study was to compare parent and child perceptions of child-level food security status via questionnaires within a large, ethnically diverse population.

Methods: Cross-sectional baseline data from a cluster-randomized controlled trial involving primarily low-income, Hispanic third- to fifth-grade students and their parents were used for analysis. The sample consisted of 2408 dyadic (parent and child) pairs. Parents completed the 8-item child-referenced Household Food Security Survey Module and their responses were compared with an adaption of the 5-item Child Food Security Assessment completed by their child. Levels of association between child and parent perceptions within dyads were calculated using Goodman and Kruskal's γ statistic. A mixed-effects binomial logistic regression model was used to model discordance as a function of child, parent, and household sociodemographic characteristics.

Results: The child sample was 53% girls, mean age of 9 y, and 63% were Hispanic. The parent sample was 86% women and 65% Hispanic. Child and parent perceptions of child-level food security agreed only 21.7% of the time. There was a weak positive association between child and parent perceptions of child-level food security ($\gamma = 0.162$, $P < 0.001$). Children perceived themselves as less food secure than their parents' perception 70.1% of the time. Household receipt of Supplemental Nutrition Assistance Program benefits was associated with greater odds of discordant food security perceptions, whereas female children, older children, and parents not working were characteristics associated with lower odds of discordant perceptions.

Conclusions: Results, in combination with the existing literature, suggest that parent perceptions of child-level food insecurity may underestimate child-level food insecurity experiences.

Inaccurate estimations or underestimations of the true prevalence of child-level food insecurity could be detrimental to maternal and child health efforts. This trial was registered at

clinicaltrials.gov as NCT02668744. *Curr Dev Nutr* 2019;3:nzz106.

Introduction

The USDA describes food security as “access by all people at all times to enough food for an active, healthy life” (1). Lack of the assured ability to acquire acceptable foods in socially acceptable ways is deemed food insecurity. Four labels are used by the USDA to describe the continuum of household food security: 1) high food security, 2) marginal food security, 3) low food security, and 4) very low food security. The first 2 labels describe food security, whereas the latter 2 describe food insecurity. Whereas 32.3 million (86.1%) US households with children were food secure in 2017, 2.7 million households with children (71%) were food insecure and 220,000 households (0.6%) experienced very low food security (2).



Keywords: child public health, children, food security, food insecurity, socioeconomic factors, family influence

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Abbreviations used: CFSA, Child Food Security Assessment; FRLP, Free and Reduced Lunch Program; HFSSM, Household Food Security Survey Module; SNAP, Supplemental Nutrition Assistance Program.

Much of prior research into the conceptualization, assessment, and impact of child food insecurity has typically been derived from the primary food decision maker within the household, the majority of whom are mothers. However, the use of parental or maternal report as a proxy for child reporting of child-level food insecurity is potentially inaccurate. Parents, particularly mothers, are often thought to shield or buffer their children from the effects of food insecurity, but research has shown that they may not always be able to fully protect their children (3–5). Parents have been found to underreport socially undesirable experiences in the fear that they may face stigma, shame, or involvement from social services (4). Furthermore, children may hide their experiences from their parents or their experiences with food may go unnoticed by their parents because these experiences often occur outside of the home where children may spend the bulk of their time. Research has shown that children as young as 6 y old are aware cognitively, emotionally, and physically of their food insecurity experiences, and are usually in a better position than their parents to accurately and reliably report about those experiences (6, 7). Fram et al. (8) found that parent-report of child food insecurity status can result in missing nearly half of children who report themselves as food insecure. It is important to note that although children may experience and be aware of the presence and consequences of food insecurity, they may not be aware of its causes owing to their limited understanding of household-level economics and barriers to access and availability of foods (9).

Realizing the frequency of underreporting or misclassification of child food insecurity by parents, existing research has focused on comparing child and parent reports of child-level food insecurity. Several studies have reported notable discordance between reports from parents and children. Previous studies have primarily focused on older child populations (>12 y old) (10–12). Other studies have utilized younger child populations; however, these studies are limited in terms of study sample size (<91 children) (8, 13, 14). There is a need to understand food insecurity from a young child's perspective within a large, ethnically diverse population. The current study focuses on a large multiethnic sample of children between the ages of 8 and 12 y. The aim of this study was to examine differences in perceptions of child-level food insecurity using an 8-item child-referenced USDA Household Food Security Survey Module (HFSSM) completed by parents compared with an adaptation of the 5-item Child Food Security Assessment (CFSA) completed by children.

Methods

Study design: TX Sprouts

Cross-sectional baseline data from TX Sprouts, a cluster-randomized controlled trial (NCT02668744), were used for analysis. TX Sprouts is a 1-y school-based gardening, cooking, and nutrition program that targets third- to fifth-grade students and their families from 16 elementary schools in the Austin area. Schools were randomly assigned into 1 of 3 waves of data collection occurring between August 2016 and October 2018. Schools included in the trial had to meet the following inclusion criteria: 1) high proportion of Hispanic children (>50%); 2) high proportion of children participating in the Free and Reduced Lunch Program (FRLP) (>50%); and 3) location within 60 miles of

The University of Texas at Austin campus. Based on these criteria, 73 schools were invited to participate, and 20 schools from 5 different independent school districts agreed to participate. The first 16 out of the 20 schools to provide letters of support were randomly assigned to either the intervention ($n = 8$ schools) or the control group (delayed intervention; $n = 8$ schools).

Recruitment of children and parents

All third- to fifth-grade students and their parents at recruited schools were contacted to participate via tables at “Back to School” and “Meet the Teacher” evening events, flyers sent home with students, and teachers making class announcements.

Ethics

Written informed consent was obtained from all parents, and assent from each student was obtained. Both consent and assent were required for inclusion in the study. This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the institutional review boards of The University of Texas at Austin and the individual school district review boards.

Data collection

At baseline, both children and parents completed a 12-page questionnaire packet that included questions on demographics and food security scales. Students completed all questionnaires during the school day at their respective schools as part of a larger data collection effort for TX Sprouts. Questionnaires were provided in both English and Spanish, and bilingual interpreters were available to assist students if needed. Parents completed take-home questionnaires that were provided in both English and Spanish, and parents received a \$15 gift card to a local grocery store as an incentive to complete the questionnaire.

Instruments assessing perceptions of child-level food insecurity

Child food security experiences were measured using a 5-item adapted version of the CFSA, which was previously validated for use with children as young as 6 y (7, 8). One emotional subdomain item “I worry about how hard it is for parents to get enough food” included in the CFSA was removed and replaced with a child food management subdomain item: “I tried not to eat a lot so that our food would last.” This item tested well in previous validation assessments (8). The items on the adapted CFSA represent 4 of 6 previously conceptualized subdomains of child food insecurity (Q1, emotional awareness; Q2–Q3, physical awareness; Q4, initiation of child food management strategies; Q5, cognitive awareness) (4). A reference frame of “in the last year” was used. Response categories were “a lot,” “sometimes,” or “never.” The full questionnaire and response categories are listed in Table 1.

Responses to the CFSA were recoded as follows: “never” = 0, “sometimes” = 1, and “a lot” = 2. Scores were summed (range: 0–10), with higher scores indicative of reporting decreased food security. Percentages of child responses to each item of the CFSA are provided in Table 1. Scores were distributed asymmetrically with a right skew. Four ordinal groups were created that corresponded with the summed scores: 0 (high food security), 1 (marginal food security), 2–3 (low food security), and 4–10 (very low food security).

TABLE 1 Child responses to the 5-item adapted Child Food Security Assessment¹

In the last year, how often...	A lot	Sometimes	Never
1. Did you worry about not having enough to eat?	14.2	39.7	46.1
2. Did you feel hungry because there was not enough food to eat?	15.2	37.5	47.3
3. Did you get really tired because there was not enough to eat?	11.5	27.1	61.4
4. Did you try not to eat a lot so that your family's food would last?	16.8	36.3	46.8
5. Did your family not get the food you wanted because there wasn't enough money?	10.7	34.3	54.9

¹ *n* = 2408. Values are percentages.

The adapted questionnaire's psychometric properties were assessed within the study population. Satisfactory Cronbach's α values were found for the 5-item questionnaire (0.82), and removal of any item from the questionnaire lowered the scale's overall value. A random subsample of 65 third- to fifth-grade students [45% boys, mean age 9.5 y (range 8–11 y)] were administered the adapted questionnaire twice, the second administration occurring 3 d after the first, to assess test–retest reliability. There was a positive correlation ($r_s = 0.52$) between time 1 and time 2 responses and an overall 82% agreement in food security classification.

The parents of students completed the 8-item child-referenced questions of the HFSSM (15). The child-referenced items included 1 screener question to confirm the children in the household followed by 7 items assessing children's food security experiences from the parent's perspective and make up the US Children's Food Security Scale. Parent responses on child-referenced items were recoded and summed in accordance with the USDA Economic Research Service recommendations (15). The screener question included as part of the HFSSM was not included in the calculation of food security scores. The affirmative responses "a lot" and "sometimes" from the questionnaire were coded as "yes" = 1, whereas the negative response "never" was coded as "no" = 0. Scores were summed to total between 0 and 7, with higher scores indicative of reporting decreased food security. Scores were distributed asymmetrically with a left skew. Four ordinal groups were created that corresponded to summed scores: 0 (high food security), 1 (marginal food security), 2–4 (low food security), and 5–7 (very low food security).

Statistical methods

For comparison of child and parent perceptions of food security, descriptive statistics (mean, SD, number, percentage) for household, child, and parent characteristics were calculated. The level of association between children and parents within dyads was calculated using Goodman and Kruskal's γ statistic. The γ statistic is a nonparametric measure of the strength and direction of the association that exists between 2 variables measured on an ordinal scale (16). An obtained value of +1 for γ indicates the presence of a perfect correlation between the 2 variables. In contrast, an obtained value of –1 indicates the presence of a perfect negative correlation. A dichotomous discordance within dyads variable (yes/no) was created by the researchers. A mixed-effects binomial logistic regression model was then used to model the discordance predicted by potential sociodemographic characteristics that may explain the discordance observed, with random effects at the school level to account for clustering by schools. All analyses were completed using SPSS Statistics for Macintosh, version 24.0 (IBM Corp), and an α level of $P = 0.05$ was used for significance.

Results

Of the 4239 eligible students at the 16 elementary schools, 3303 children (78%) consented to be in the TX Sprouts study. Out of those consented children 3137 (94%) completed baseline clinical measures and were included in the clinical trial. For this analysis, 2408 child and parent dyads (77%) had complete food security survey data. Household characteristics of child and parent dyads are recorded in Table 2. A majority of children reported receiving meals as part of the FRLP (67%) and 34% of households received benefits from the Supplemental Nutrition Assistance Program (SNAP). The child sample was 53% girls, mean age of 9 y, and were primarily Hispanic (63%). The parent sample was primarily women (86%) and consisted of 98% parents and 2% grandparents or another guardian. The parent sample was majority

TABLE 2 Household characteristics and demographics of child and parent dyads¹

	Mean \pm SD or <i>n</i> (%)
Household characteristics	
Number of children in the home	2.8 \pm 1.2
Number of adults in the home	1.7 \pm 1.0
Receive SNAP benefits	810 (33.6)
Child sample	
Age, y	9.2 \pm 0.9
Gender	
Female	1281 (53.2)
Ethnicity/race ²	
Non-Hispanic white	445 (18.5)
Hispanic	1525 (63.3)
Non-Hispanic black	198 (8.2)
Other ³	120 (5.0)
Undisclosed	120 (5.0)
Participate in FRLP	1615 (67.1)
Parental sample	
Ethnicity/race	
Non-Hispanic white	531 (22.1)
Hispanic	1554 (64.5)
Non-Hispanic black	190 (7.9)
Other ³	81 (3.4)
Undisclosed	52 (2.2)
Gender	
Female	2070 (86.0)
Male	295 (12.3)
Undisclosed	43 (1.8)
Born outside the United States	1004 (41.7)

¹ *n* = 2408. FRLP, Free and Reduced Lunch Program; SNAP, Supplemental Nutrition Assistance Program.

² Response provided by the parent.

³ Other includes Asian, Pacific Islander, Native American, American Indian, or other ethnicity.

TABLE 3 Agreement of parent (via 8-item child-referenced HFSSM) and child (via 5-item adapted CFSA) perceptions of child-level food security status¹

Participant	Level of food security	Child				Total
		High	Marginal	Low	Very low	
Parent	High	335 (13.9)	211 (8.8)	422 (17.5)	599 (24.9)	1567 (65.1)
	Marginal	61 (2.5)	33 (1.4)	76 (3.2)	159 (6.6)	329 (13.7)
	Low	56 (2.3)	68 (2.8)	125 (5.2)	219 (9.1)	468 (19.4)
	Very low	2 (0.1)	6 (0.2)	8 (0.3)	28 (1.2)	44 (1.8)
	Total	454 (18.9)	318 (13.2)	631 (26.2)	1005 (41.7)	2408 (100)
Percent agreement ²				21.7%		
γ Statistic (P value)				$\gamma = 0.162 (<0.001)$		

¹CFSA, Child Food Security Assessment; HFSSM, Household Food Security Survey Module. Values are *n* (%) unless indicated otherwise.

²Percent agreement between parent and child perceptions calculated by summing totals in High/High, Marginal/Marginal, Low/Low, and Very low/Very low regions and dividing by the total sample.

Hispanic (65%). Nearly half (42%) of the parent sample was born outside of the United States.

Child and parent perceptions of child-level food security agreed only 21.7% of the time (Table 3). There was a weak positive association between child and parent perceptions of child-level food security ($\gamma = 0.162$, $P < 0.001$). Perceptions differed by 1 food security classification 26.7% of the time, differed by 2 categories 26.6% of the time, and differed by 3 categories 25.00% of the time. Children perceived themselves as being more food insecure than their parents' perception (parent underreport of severity) 70.1% of the time. Children perceived themselves as more food secure than their parents' perception (parent over-report of severity) 8.2% of the time.

A mixed-effects binomial logistic regression model was used to model the discordance predicted by potential sociodemographic characteristics that may explain the discordance observed. Children from households that received SNAP benefits were more likely to have discordant perceptions (β : 1.50; 95% CI: 1.06, 2.00; $P = 0.021$) than children from households that did not report receiving SNAP benefits (Table 4). Girls were less likely (β : 0.63; 95% CI: 0.48, 0.81; $P < 0.001$) to have perceptions that were discordant with those of their parents. Compared with children aged 8 y or younger, children aged 10 y or 11 y or older were less likely to have discordant food insecurity perceptions (β : 0.63; 95% CI: 0.48, 1.16; $P = 0.001$ and β : 0.63; 95% CI: 0.37, 0.82; $P = 0.004$, respectively). Parents who reported no work compared with those that reported working full time or more were less likely to have discordant perceptions (β : 0.79; 95% CI: 0.67, 0.94; $P = 0.006$).

Discussion

The aim of this study was to compare parent and child perceptions of child-level food security status via questionnaires. Parental and child dyad reports of child food insecurity showed poor agreement when comparing responses on the 8-item child-referenced HFSSM completed by parents, and the 5-item adapted CFSA completed by children. In addition, 1686 children (70% of the sample) perceived more food insecurity experiences than did their parents. Existing literature (8, 11, 14) in child populations <12 y old has previously reported disagreement between parent and child reports of child-level food security. The results of this study, with its much larger multiethnic

sample (2408 dyadic pairs), further corroborate former findings of large discordance between perceptions within dyads. Based on prior literature, these results suggest that parental report may be unrepresentative of actual child food insecurity experiences and if a parent proxy is used, prevalence of child-level food insecurity may be grossly underestimated (8, 10, 11, 14, 17).

In other areas of health research, child self-report is considered the "gold standard" for assessing a child's internal experiences (18, 19). Further, in many settings, having a validated questionnaire that can be administered directly to a child to measure their own reported food security status is advantageous when an adult proxy is not feasible or practical. Qualitative research in food-insecure households has found that parents are not fully aware of the extent of a child's cognitive awareness with regard to food insecurity experiences and are often even more unaware of a child's emotional or physical awareness (17). Because of this, a parent's knowledge or their awareness of his/her children's experiences, exposure, and resource allocation can flaw parent report.

A common reason for discordance between parent and child reports of child-level food insecurity is that parents believe they are shielding their children from the effects of food insecurity in their households. Shielding or buffering has been found to be multidirectional, extending from parent to child, parent to parent, child to child (especially older to younger), or child to parent, as well as taking different forms such as eating less so that someone else can eat more, or pretending not to be hungry (20). Compared with previous studies reporting discordance, a much greater number of children perceive themselves as more food insecure than their parents perceive them to be. Differences in sociodemographic characteristics and the use of different measures of food insecurity may explain some of the variation between studies.

This study found that several sociodemographic characteristics were associated with the discordance observed. Dyads from households that received SNAP benefits compared with dyads that didn't receive SNAP benefits were more likely to perceive food insecurity discordantly. Although the intent of SNAP is to provide supplemental income for food, research has found that some households receiving benefits may fall short of food at the end of the month and report feelings of hunger (21). This "SNAP Gap" may be perceived differently by children than their parents. Further, because children have limited understanding of household-level economics and barriers, this may lead to a varied food security perception. Within this study, a child's participation in

TABLE 4 Mixed-effects binomial logistic regression of sociodemographic characteristics on the discordance between child and parent perceptions within dyads of child-level food insecurity¹

Sociodemographic characteristics	Standardized β (95% CI)	P value
Household characteristics		
Receive SNAP benefits		0.021
No	Referent	—
Yes	1.46 (1.06, 2.00)	0.021
Number of children in the home	0.99 (0.91, 1.07)	0.706
Number of adults in the home	0.96 (0.88, 1.04)	0.301
Language spoken at home		0.686
English	Referent	—
Spanish	1.31 (0.74, 2.34)	0.356
Dual language	1.14 (0.63, 2.07)	0.658
Other	1.05 (0.50, 2.23)	0.893
Child characteristics		
Age, y		<0.001
≤ 8	Referent	—
9	0.92 (0.70, 1.20)	0.558
10	0.63 (0.48, 0.81)	0.001
≥ 11	0.55 (0.37, 0.82)	0.004
Gender		<0.001
Male	Referent	—
Female	0.63 (0.53, 0.76)	<0.001
Ethnicity/race		0.209
Hispanic	Referent	—
Non-Hispanic white	0.74 (0.48, 1.16)	0.189
Non-Hispanic black	1.42 (0.68, 2.96)	0.351
Other	1.29 (0.66, 2.52)	0.459
Participate in FRLP		0.275
No	Referent	—
Yes	1.17 (0.88, 1.57)	0.275
Parent characteristics		
Ethnicity/race		0.186
Hispanic	Referent	—
Non-Hispanic white	0.87 (0.55, 1.37)	0.551
Non-Hispanic black	0.47 (0.23, 0.96)	0.039
Other	0.54 (0.17, 1.70)	0.295
Parent nativity		0.433
Born in the United States	Referent	—
Born outside of the United States	0.85 (0.57, 1.28)	0.433
Parent education		0.500
Greater than a high school diploma	Referent	—
High school diploma	1.13 (0.91, 1.40)	0.263
Less than a high school diploma	1.08 (0.77, 1.51)	0.661
Parent employment		0.007
Full-time or more	Referent	—
Part-time	0.84 (0.67, 1.04)	0.102
No work	0.79 (0.67, 0.94)	0.006

¹Model reference category was concordance between child and parent perceptions within dyads. FRLP, Free and Reduced Lunch Program; SNAP, Supplemental Nutrition Assistance Program.

the FRLP, another food assistance program, was not associated with discordance in perception.

Girls, as compared with boys, were less likely to have discordant perceptions of food insecurity relative to their parents, which is consistent with results found by Carlos Chavez et al. (10). Children who were aged ≥ 10 y, compared with younger children, were less likely to have perceptions of food insecurity discordant with those of their parents. This is consistent with the perception that children closer to adolescence may understand the more complex nature of food insecurity and its causes; however, this doesn't imply that the parent's

perception was always accurate or representative of the child's actual food security experiences (9). Lastly, this study found that children from households where the primary food purchaser and preparer had no work outside of the home were less likely to have perceptions discordant with those of their parents. We hypothesize that within these households, children were more aware of their parents' unemployment and the potential shortages in money or food that were experienced by the household.

Unique to this study is the large multiethnic sample population (2408 dyadic pairs; 4816 total participants). Hispanics represent the

United States' largest ethnic minority, comprising 17.6% of the total population, and are the fastest-growing ethnic group (22). This quickly growing population is disproportionately affected by poverty and food insecurity and is at increased risk of being obese and developing type 2 diabetes (23–25). There is an urgent need to better understand food insecurity and its effects within this population to lessen the burden of health disparities. This study also highlights the extent to which underreporting of child-level food security may occur within a multiethnic, at-risk population.

This study did not address which report, child or parent, was more accurate regarding children's actual food-related experiences. However, children's reports of their food security experiences have been previously shown to be substantially more accurate, based on the work of Fram et al. (8), which developed a definitive measure to which the child and parent questionnaire-based measures could be compared. Therefore, the interpretation of results from this study with a large multiethnic cohort only further corroborates an existing problem in accurately measuring child-related food insecurity. A potential limitation of this study was a change to the original wording to item 5 on the CFSA from "...we want because there is not enough money" to "...you wanted because there was not enough money." This change was made for clarity and to match the verbiage of the other items of the assessment. Although the researchers do not anticipate this to affect the results found in this study, it is a potential source of error. A child's report of his/her individual experiences and food security status was assessed; however, this may not be reflective of other children in the household. Further research should elect to measure agreement of perceptions between children within the same household. Another potential limitation is that these data were collected in August/September when students were returning to school from summer break. The high rates of food insecurity, especially very low food insecurity, perceived by children may be a result of limited summer access to foods or programs (e.g., FRLP) providing foods. Children were asked to report on their food security experiences in the past year; however, students may have reported on more recent experiences and lack of food.

In conclusion, there is a need to directly and accurately conceptualize and measure food insecurity in children as part of surveillance and monitoring efforts. Results of this research in combination with existing literature suggest that parent perceptions of child-level food insecurity may underestimate child-level food insecurity experiences. Ending child food insecurity requires a systematic approach through concentrated public health efforts. Physicians—especially pediatricians—and other health care providers such as registered dietitians play a vital role in screening patients and clients for food insecurity. These health care providers also play an essential role in advocating for programs and policies that work toward ending child food insecurity (26, 27). The results of this study suggest that pediatricians and registered dietitians should be further educated to ask not only parents about the home food environment and potential risk of food insecurity but also children about their individual experiences. This study also provides insight to practitioners on how specific sociodemographic characteristics may influence perception of food insecurity experiences. Reliable and accurate measurement of child food insecurity begins with a grounded understanding that children's experiences with food security are different than those of their parents. Inaccurate estimations

or underestimations of the true prevalence of child-level food insecurity could be detrimental to public health efforts of linking vulnerable individuals with resources and programs.

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