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Psychometric properties of the Child Eating Behavior Questionnaire (CEBQ) in school age children with overweight and obesity: A proposed three-factor structure

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Summary

Background: Obesity in youth is a significant public health concern, with eating behaviors being a major contributor. The Child Eating Behavior Questionnaire (CEBQ) was developed to evaluate the appetitive characteristics of young children, across a myriad of eating domains. Despite the breadth of its use, the psychometric properties of the measure in children with overweight/obesity (OW/OB), particularly treatment seeking youth, remains largely unexplored.

Methods: The psychometric properties of the CEBQ were examined in a sample of school age children (8–12) with OW/OB. Parent–child dyads (N = 148) completed assessments prior to beginning a family weight management program. Exploratory factor analysis (EFA) was performed utilizing polychoric correlations, and emerging subscales were assessed to ensure that the range of response scores demonstrated adequate variability. Indices of the number of factors to be retained included acceleration factor (2), optimal coordinates (4), Velicer's MAP (5) and parallel analysis (11). These indices were used in combination with clinical utility to determine the final factor structure.

Results: A three-factor structure emerged. The first factor combined many food responsiveness, enjoyment of food, satiety responsiveness and slowness in eating items, with the latter two

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AUTHOR CONTRIBUTIONS

Kerri N. Boutelle was the principal investigator responsible for the original study and data collection. Michael A. Manzano and Kerri N. Boutelle conceptualized the present study. Michael A. Manzano conducted statistical analyses, prepared all figures and tables and wrote the majority of the manuscript. David R. Strong and D. Eastern Kang Sim aided in interpreting analyses. All authors provided critical revision of the manuscript for important intellectual content.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

domains loading negatively. The second factor retained the food fussiness subscale, and the third factor included items from the emotional overand under-eating subscales.

Conclusions: These results suggest that in children with OW/OB, eating behaviors may be optimally assessed using three domains: reward-based eating, emotional eating and picky eating. Future research should explore how this structure holds in non-treatment-seeking samples and across wider socio-demographic profiles.

1 | INTRODUCTION

With current rates of obesity in children reaching 18.5% in the U.S. population, understanding patterns of children's eating behaviors that convey risk and maintenance of "obesogenic" eating behaviors remain an urgent public health goal.[1,2] The Child Eating Behavior Questionnaire (CEBQ) was developed to fill the need to quantify obesogenic risk in children, assessing eight eating domains related to the development of obesity, including food responsiveness, enjoyment of food, emotional overeating, desire to drink, satiety responsiveness, slowness in eating, emotional undereating and picky eating.[3] Four subscales were proposed to fall under the larger construct of food approach (ie, food responsiveness, enjoyment of food, emotional overeating, desire to drink), and the remaining four subscales to fall under the larger construct of food avoidance (ie, satiety responsiveness, slowness in eating, emotional undereating, picky eating). Food approach is the broad construct of behaviors that are likely to initiate or increase food consumption, while food avoidance is characterized by behaviors likely to end or limit food consumption. The CEBQ development process utilized multiple samples of children with the average ages falling between 4 and 6 years old, and the later validation study included 4- and 5-year of children.[3,4] Despite the original design of the CEBQ to assess obesogenic risk in young, healthy weight children, the authors latter posited the measure as an assessment tool in evaluating current "obesogenic" eating behaviors across the spectrum of weight statuses.[4] Thus, the CEBQ has be described as a parent-report instrument used to quantify eating behaviors related to obesity across the developmental span and BMI range.

Three CEBQ domains (ie, food responsiveness, enjoyment of food and satiety responsiveness) have demonstrated good convergence with behavioral measures of food consumption in young children. The food responsiveness and enjoyment of food domains from the CEBQ have shown moderate associations with greater overall energy intake and faster eating rate, in addition to enjoyment of food being associated with greater calorie consumption during eating in the absence of hunger (EAH) ad libitum eating paradigm.[4] The satiety responsiveness domain has been associated with lower overall calorie consumption, slower eating rate and lower calorie consumption during the EAH eating task.[4] However, not all CEBQ domains have been examined for evidence demonstrating construct validity, and additional evidence supporting the utility and validity of the remaining CEBQ subscales is needed. In developing and validating the efficacy of the CEBQ, psychometric analyses have relied upon community samples of primarily young children with a healthy weight and focused on establishing evidence for the acceptable range of reliability of scores across all the eight original subdomains.[3–6] Moreover, while the CEBQ has been used and translated internationally, the psychometric properties of the CEBQ in older, pre-adolescent

youth with overweight/ obesity and those seeking treatment for obesity remain largely unexplored.

In addition to potential issues of sample representativeness, analytic methodologies of prior psychometric studies have varied, with principal components analysis (PCA), exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) all being utilized.[4–7] The originnal PCA described in Wardle et al 2001 suggested a seven-factor structure, but the authors retained all eight proposed domains as they were still seen to have clinical utility. Subsequent studies have primarily utilized CFA, demonstrating a range of model fit of the seven- and eight-factor structure solutions from adequate to poor fit in non-clinical samples of young children.[3,5,6] Shortened versions of the CEBQ have also been used, selecting only domains of interest and moderate subscale reliability has been found.[7] Furthermore, differences in sample characteristics, including age and weight status, may contribute to lack of coherence in support of the construct validity of the originally proposed four food approach domains and four food avoidant domains. Njardvik et al (2018) examined the factor structure of the CEBQ in 10 published studies from nine countries and found seven studies combined at least two factors, with three-,six-,seven- and eight-factor structures being found.[8] The present study examined the psychometric properties of the CEBQ in a sample of treatment seeking, school age children with OW/OB, investigating whether a single factor, two higher order factors (ie, the original 8-factor structure under two higher order domains of food approach and food avoidance) or a novel structure best organize the assessment constructs.

2 | METHODS

Baseline data from the Family, Responsibility, Education, Support and Health (FRESH) study, a randomized clinical non-inferiority trial, were utilized with recruitment and treatment methodology detailed in a previous publication.[9] Eligibility criteria included children ages 8 to 12 years with a body mass index (kg/m^2, BMI) percentile in the overweight or obese ranges who were free of medical or psychiatric conditions that could interfere with study participation (eg, eating disorder, severe depression, unmanaged bipolar depression). Inclusion criteria for the parent included a BMI of at least 25 kg/m^2, English fluency at a fifth-grade level, and be able to participate on designated treatment nights. Written parent consent and child assent were obtained prior to assessments, and the institutional review boards of the University of California San Diego and Rady Children's Hospital, San Diego, California approved the study.

2.1 | Instruments

Child Eating Behaviour Questionnaire (CEBQ): The CEBQ is a 35-item parent report of children's eating behaviors across eight proposed domains, with a five-level Likert-type response scale (1 = "Never" to 5 = "Always").[3] The hypothesized domains included four-food approach domains and four-food avoidance domains. The four-food approach domains include food responsiveness, enjoyment of food, desire to drink and emotional over-eating. The four-food avoidance domains include satiety responsiveness, slowness in eating, food fussiness and emotional under-eating.

Eating in the Absence of Hunger Questionnaire (EAHQ): The EAHQ is a 14-item questionnaire completed by a parent which assesses a child's eating habits when not physically hungry in response to external cues, negative affect and boredom. Responses are reported using a five-level Likert-type response scale (1 = "Never" to 5 = "Always"), and total and subscale scores can be generated by taking the mean of the included items.[10] As this instrument was designed to assess eating beyond caloric needs, the EAHQ was used to assess convergent validity. Both eating in response to external cues and negative affect subscale scores were hypothesized to be positively associated with the food approach domains and negatively associated with the food avoidance domains. In the present sample, the external cues and negative affect subscales were used, and both subscales demonstrated adequate reliability (external cues: $\alpha = 0.94$; negative affect: $\alpha = 0.80$).

Child Behavior Checklist (CBCL): The CBCL is a parent-report questionnaire assessing internalizing and externalizing problems experienced by their child. The CBCL yields age-adjusted percentile scores for a variety of children's problems, including internalizing, externalizing and overall behavioral difficulties.[11] All domains of the CBCL have been shown to demonstrate strong reliability and validity across age, sex and sociodemographic and clinical populations.[12,13] The CBCL was used to test divergent validity from emerging CEBQ domains, ensuring food-specific behaviors reported by parents were not being conflated with overall behavioral patterns.

Anthropometrics: Parent and child anthropometric data were obtained via trained assessors, with both height and weight measured in duplicate. The two values obtained at initial baseline assessment were averaged to calculate body mass index (BMI; calculated as weight in kilograms divided by height in meters squared). For children, age-adjusted BMI percentile (%BMI) and standardized BMI (zBMI) were calculated.[14]

2.2 | Statistical analysis

Of the 150 dyads who completed the FRESH study, 148 had complete CEBQ data which were used for all subsequent analyses. Descriptive and factor analyses were ran using R version 3.6.0.[15] Factor analysis was performed using the "psych" and "mirt" packages in R, utilizing promax rotations and maximum likelihood factor extraction.[16] Exploratory factor analysis (EFA), hierarchical analysis and reliability of identified factors were used to evaluate the characteristics of the set of 35-items.

2.3 | Construct validity

The following approaches were used as indices to determine the number of factors to be retained: Kaiser-one approach,[17] Velicer's MAP criteria,[18] Horn's parallel analysis,[19] acceleration factor[20] and optimal coordinates.[20] Each factor extraction approach has its strengths and weaknesses, with the Kaiser-one approach being the weakest.[21] Parallel analysis will show the number of statistically reliable factors but not weigh in on interpretability or qualitative cohesion of items extracted together. The acceleration factor, optimal coordinates and Velicer's MAP indices are typically most useful as the non-graphical nature of their calculations employs more rigorous quantitative strategies than are used in the Kaiser-one or parallel analytic approaches. Communality (h^2) was also used

to estimate the proportion of item variance each item contributed to the common variance. Retained items were required to have a commonality above 0.20 and loading above 0.40 on an assigned factor and low (<0.20) loadings on additional factors.[22] Factor extraction techniques are based upon correlations and disregard item content. Thus, quantitative strategies were used in combination with clinical utility to ensure emerging domains were not only statistically sound but also maintained interpretability.

2.4 | Reliability coefficients

Internal scale reliability was assessed using Cronbach's coefficient alpha (α).[23] McDonald's coefficient omega (ω) was used as another metric of reliability, which measures the proportion of variance accounted for by the general construct of interest.[24]

2.5 | Hierarchical model indices

In addition to EFA, hierarchical bifactor models were examined to test the proposed hierarchical nature of the CEBQ of two higher order domains (ie, food approach and food avoidance) and four-lower order domains under each, resulting in the eight total lower order domains. Bayesian Information Criteria (BIC) was used to determine model section, with lower values indicating better model fit.[25]

2.6 | Test information function

Item information curves (IICs) were used to investigate where information from each item is maximal and how the range of responses was being represented in the current sample.

The more area under the curves, the more information the item is providing, as information is defined as the inverse of error in each item. The test information function (TIF) represents the aggregated IICs for all items in that factor and is indicative of how well the measure accurately assesses the latent trait at various response levels of the factor construct, which can be explored using two qualitative criteria. First, TIF graphs should peak toward the center, as that is the mean value of the latent construct. Second, TIF graphs should not be too narrow, as that would indicate a truncated range of responses. The specific values for total information and theta spread are of less interest than would be the case in classical test theory.[26]

2.7 | Convergent and divergent validity

Convergent validity was assessed using Spearman correlations between identified CEBQ factors and the external eating and negative affect subscales of the EAHQ in addition to internalizing problems as identified by the CBCL. Divergent validity was assessed using spearman correlations between scales formed from the CEBQ and externalizing problems as identified by the CBCL.

3 | RESULTS

3.1 | Demographic information

Parents reported socio-demographic data for both themselves and their child. Children were a mean age of 10.4 years and 67% (N = 99) identified their sex as female. The sample was

somewhat racially and ethnically diverse with 32% identifying as Hispanic. Table 1 includes more detailed child and parent demographic information.

3.2 | Exploratory factor analysis (EFA)

Factor extraction indices suggested differing numbers of factors to be retained: acceleration factor-2, optimal coordinates-4, Velicer's MAP criteria-5, Horn's parallel analysis-11 and Kaiser-one approach-13. Due to lack of agreement across factor extraction methods, optimal factor extraction was explored through iterative comparison of models with 1–5 factors, as models with more than five factors had fewer than three items with loadings >0.20. Communality, factor reliability and clinical interpretability were used to compare factor solutions.

A one-factor model suggested 18 of the original 35 items contributed significantly with factor loadings over 0.40, 17 items had a commonality above 0.20, and the single factor did not reflect a coherent clinical domain. A two-factor model also failed to account for substantial variance among many items, with only 24 items loading onto one of the factors, 23 items had a commonality above 0.20 and the second factor was not interpretable. A three-factor model included 27 items with a commonality above 0.20, and the three factor structure was the first to reveal clinically interpretable factors and demonstrated strong reliability of each of the factors (Factor 1: $\alpha = 0.89$, $\omega = 0.89$; Factor 2: $\alpha = 0.93$, $\omega = 0.93$; Factor 3: $\alpha = 0.84$, $\omega = 0.85$), (Tables 2 and 3). Thus, when combining all specifications, a three-factor structure emerged as the most parsimonious solution. This three-factor model appears to assess reward-based eating (Factor 1), picky eating (Factor 2) and emotional eating (Factor 3).

3.3 | Hierarchical factor structure

A higher order model with two higher order factors and eight lower order factors was not supported as models did not converge. Iterative hierarchical analyses were conducted to examine whether a common underlying construct might organize the three correlated domains identified using EFA, none of which suggesting the presence of higher order factors that helped explain the factors found using EFA, as the higher order model had a Bayesian Inclusion Criteria roughly double that extracted from the EFA (proposed three-factor model BIC: 12758.4 vs proposed hierarchical model BIC: 26466.4).

3.4 | Test information function

Item information curves were examined and aggregated to investigate response variability across each proposed factor independently. These information curves revealed responses were reported across the behavioral continuum of each domain, suggesting that while the sample represented only one end of the body mass index range, the behaviors of these children were still heterogeneous (Figure 1).

3.5 | Convergent and discriminant validity

The external eating score from the EAHQ was associated with the newly proposed reward-based eating subscale (Factor 1; $r = 0.61$, $P < .001$), and the negative affect eating score was associated with the proposed emotional eating subscale (Factor 3; $r = 0.50$, $P < .001$). This

provides further evidence that Factors 1 and 3 is indeed assessing different reward-based eating and emotional eating, respectively. The Child Behavior Checklist externalizing score was not significantly associated with Factors 1 or 3 (Factor 1: $r = -0.04$, $P = .61$; Factor 3: $r = 0.06$, $P = .46$) but was significantly associated with Factor 2 ($r = 0.24$, $P < .01$). This suggests that Factor 2, proposed to assess picky eating, may be more related to overall behavioral problems, while the reward-based and emotional eating subscales were not. Furthermore, the proposed emotional eating subscale (Factor 3) was not significantly associated with the CBCL-internalizing score ($r = 0.06$, $P = .44$), suggesting the proposed factor is not just assessing a child's general emotions, but emotions in the context of eating behaviors.

4 | DISCUSSION

In our sample of school-age children with OW/OB, a three-factor structure provided the best fit within the range of factor extraction indices while maintaining clinical utility. The three-factors, reward-based, picky and emotional eating, parallel the original CEBQ domains, collapsed certain domains. These factors not only make theoretical sense; they also parallel domains found in other assessments of eating behaviour.[27,28]

The first factor, reflecting reward-based eating, includes items from the originally defined domains of food responsiveness, enjoyment of food, satiety responsiveness and slowness in eating, with items from the latter two domains loading negatively onto this factor. These results parallel to the associations found in the validation studies of CEBQ, which consistently demonstrate food responsiveness and enjoyment of food are significantly and positively associated with each other, and that these domains are significantly and negatively associated with satiety responsiveness and eating rate.[3–6,29] While these associations have been extensively noted, past psychometric analyses have not explored how those interrelated subscales may represent a unified construct. The present study provides support that when using current best practices in psychometric analysis, including the use of polychoric correlations and exploration of hierarchical models, the original subscales of food responsiveness, enjoyment of food, satiety responsiveness and slowness in eating are reflective of one domain. Moreover, the distillation of several subdomains of the originally defined CEBQ subscales related to eating in response to non-physiological hunger parallels burgeoning neural work that acknowledges the influence of other cognitive processes on eating behavior. These processes include learning, reward-processing and motivation to eat; however, it is unclear how they interact to cause rewardbased eating behaviors.[30–32] Relatedly, parents of school-age children are unlikely to be able to discern if their child was eating because of external food stimuli, lack of sensitivity to internal satiety cues or they enjoy eating and are behaviorally only able to tell that their child is eating more than is expected.

Picky eating was reflected in the second factor and was the only originally defined CEBQ domain to remain. This suggests that fussiness around food is a construct that is separate from the drive to eat (identified in Factor 1). Indeed, while picky eating typically emerges during infancy and toddlerhood, there is evidence that this eating behavior can be found across the lifespan, from early childhood through adulthood.[33–37] As picky eating has been

associated with decreased vegetable consumption and the development of obesity, this may be an important domain to target among children with OW/OB.[38–40]

Emotional eating was captured by the third factor by collapsing the emotional over-and under-eating domain items. This may have occurred because undereating is less common in children with OW/OB, and this sample consisted of treatment seeking children with OW/OB. Nevertheless, emotional eating is experienced across the lifespan, with children as young as three demonstrating the link between affect and food intake as assessed by behavioral paradigms and parent-reported measures.[41,42] Furthermore, eating in response to emotions has been related to body weight and loss of control eating in children and adolescence.[41,43,44] Thus, emotional eating remains an highly important construct in assessing eating behaviors in youth.

While the three domains that emerged were related to the original domains described in Wardle et al 2001, the proposed domains lacked the specificity of those original domains. Interestingly, this same pattern was found in the same sample investigating the psychometric properties of the Emotional Eating Scale for Children and Adolescents (EES-C).[45,46] Kang-Sim et al (2019) found that in the same sample of children as in the present study, the three factor structure of the EES-C was not supported and a single factor emerged as the best fitting model. This may reflect that while parents are able to report on their children's behaviors, the nuance with which they can accurately report these behaviors is limited, further indicating parents are more likely to have insight into more general reasons for eating such as for reasons outside of physiological need, food fussiness or emotions[47,48] How these findings generalize to other treatment seeking samples of youth with OW/OB and larger samples of children across the age spectrum in general remains to be explored.

The proposed three-factor structure for the CEBQ is likely to hold benefits in both research and clinical realms. A fundamental tenet of measurement is the assessment that must be psychometrically sound for any meaningful information to be derived. Furthermore, the psychometric properties of reliability and validity must not only be true generally but for the specific sample of the investigator or clinician.[49] While the present study supports both, the latter tenet is particularly relevant. The CEBQ has been studied in a myriad of somewhat similar samples, treatment seeking youth with overweight or obesity is likely to have differing eating patterns compared to non-clinical samples. Additionally, beyond researchers who are specifically investigating very nuanced appetitive traits, the potentially distinct mechanisms for eating outside of physiological hunger are of little interest in most non-clinical samples. Therefore, creating a three-factor structure that correlates to observable behaviors may be more clinically relevant. Terms like "satiety responsiveness," "emotional undereating" and "food approach" are not commonplace in any healthcare settings, so the proposed terminology is also likely to increase measurement use. Lastly, a recent narrative review of appetitive traits in youth and adult samples targeting weight management has called into question the distinctness of the original CEBQ subscales.[50] For example, the authors propose that food- and satiety-responsiveness may represent one domain as opposed to completely distinct domains. Taken together, the proposed three-factor structure is likely to benefit treatment seeking youth with respect to both increased validity and clinical utility.

The present study has a number of strengths. First, the present analyses represent current best practices in psychometric analysis,[51] ensuring both the use of polychoric correlations within the EFA context and exploring a hierarchical factor structure. Previous psychometric studies have primarily utilized confirmatory factor analyses based on the use of Pearson correlations. However, this is problematic for two reasons. First, the use of Pearson correlations for ordinal data collected using a Likert-type response scale can be misleading, as violations of normality are likely and polychoric correlations can help correct for modest assumptions violations.[52] Second, CFA conventional fit criteria are largely unmet for multifactorial scales.[53] Additionally, the present sample was somewhat socioeconomically and ethnicity diverse, with approximately one in four families earning less than $50 000/year, only 14% making over $100 000/year and one third of children identifying as Hispanic.

Despite these strengths, the present study is not without weaknesses. As all the children were treatment seeking, they may not fully represent the heterogeneity of appetitive behaviors seen in children with OW/OB. Furthermore, we did not have data from children with healthy weight or any more objective assessments of eating behaviors with which to compare our findings. Moreover, while the 148 dyads in the present study are reasonable for a clinical trial, the sample is smaller than some other psychometric investigations and larger samples would provide greater evidence to support or refute the current findings. Additional analyses by gender could also be conducted with larger samples. Lastly, there is evidence that genetic factors play a role in the variability one sees in eating behaviours. How these genetic factors relate to the three factors of reward-based, picky and emotional eating remains to be explored.

In sum, the present findings suggest than in school-age children with OW/OB, the CEBQ may best be analyzed using three factors: rewardbased eating, picky eating and emotional eating. These three factors were identified using advanced psychometric analyses, ensuring reliable and valid domains are being applied to the present sample, children with OW/OB, for which sound psychometric assessments of eating behaviors are essential. Moreover, the proposed three factors may be more clinically useful, as the proposed domains are perhaps easier for clinicians and parents alike to understand compared to the originally described subscales. Future work should investigate the three-factor structure of the CEBQ in school-age children and adolescents of all weight statues over time to more robustly assess score reliability and construct validity.

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Abbreviations:

BMI	body mass index
CEBQ	Child Eating Behavior Questionnaire
CFA	confirmatory factor analysis

EFA	exploratory factor analysis
PCA	principal components analysis

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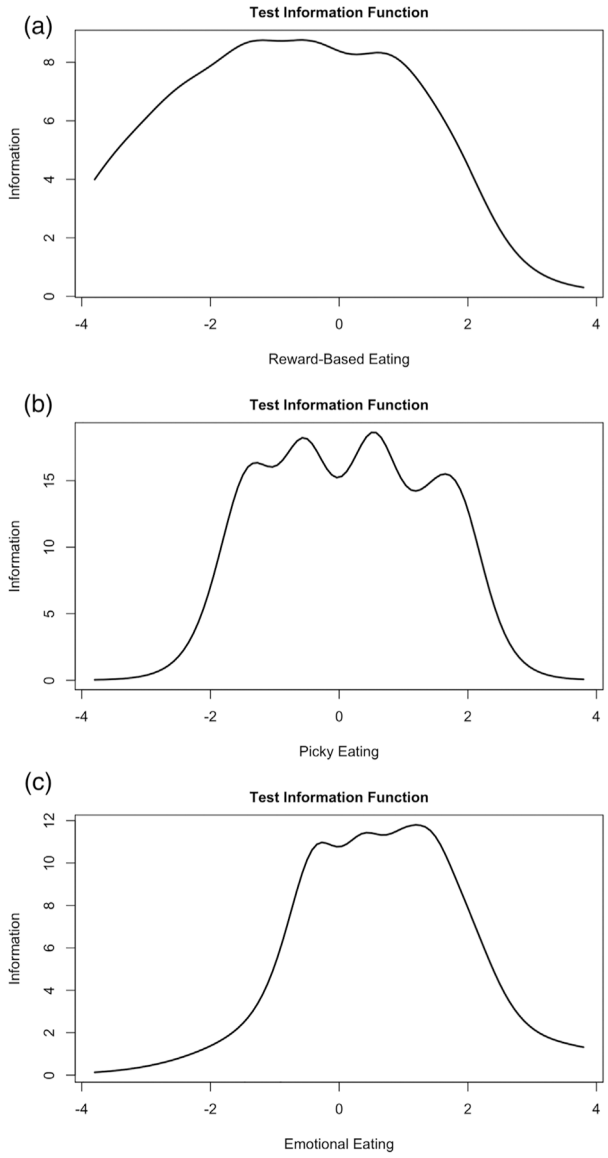

FIGURE 1.
Test Information functions by factor

TABLE 1

Sample characteristics

Demographics, N (%) unless stated otherwise	Child	Parent
Age (years), mean (SD)	10.38 (1.26)	42.97 (6.47)
Sex (female)	99 (67%)	127 (86%)
Race/ethnicity		
Hispanic	47 (32%)	47 (30%)
Non-Hispanic, white	64 (43%)	71 (48%)
Non-Hispanic, other	35 (24%)[a]	29 (20%)[b]
Anthropometrics, mean (SD)		
BMI	26.32 (3.61)	32.03 (6.30)
BMI percentile	97.06 (2.50)	
zBMI	2.00 (0.34)	
Family income		
<$50 000/ year		41 (28%)
$50 000-$99 999/ year		85 (58%)
>$100 000/ year		20 (14%)

[a]For children, “Non-Hispanic, Other” consisted of the following: Native American/Alaska Native (3), Asian (9), Hawaiian Native/Other Pacific Islander (4), Black (9), Multiple (10).

[b]For parents, “Non-Hispanic, Other” consisted of the following: Native American/Alaska Native (3), Asian (9), Hawaiian Native/Other Pacific Islander (3), Black (9), Multiple (5).

TABLE 2

Factor loadings from the results of a 3-factor solution

#	Item	Factor1	Factor 2	Factor 3	h^2 [a]
1	My child loves food	0.63			0.47
2	My child eats more when worried			0.74	0.64
3[b]	My child has a big appetite	−0.58			0.33
4	My child finishes his/her meal quickly	−0.51			0.27
5	My child is interested in food	0.70			0.50
6	My child is always asking for a drink				0.05
7	My child refuses new foods at first		0.82		0.68
8	My child eats slowly	−0.44			0.20
9	My child eats less when angry			0.63	0.40
10	My child enjoys tasting new foods		0.80		0.65
11	My child eats less when s/he is tired				0.18
12	My child is always asking for food	0.68			0.47
13	My child eats more when annoyed			0.75	0.63
14	If allowed to, my child would eat too much	0.70			0.52
15	My child eats more when anxious			0.82	0.78
16	My child enjoys a wide variety of foods		0.81		0.69
17	My child leaves food on his/her plate at the end of a meal				0.12
18	My child takes more than 30 minutes to finish a meal				0.08
19	Given the choice, my child would eat most of the time	0.67			0.49
20	My child looks forward to mealtimes	0.66			0.48
21	My child gets full before his/her meal is finished				0.18
22	My child enjoys eating	0.67			0.48
23	My child eats more when she is happy			0.50	0.35
24	My child is difficult to please with meals		0.75		0.57
25	My child eats less when upset			0.55	0.31
26	My child gets full up easily				0.14
27[c]	My child eats more when s/he has nothing else to do				0.35
28	Even if my child is full up s/he finds room to eat his/her favorite food	0.59			0.40

#	Item	Factor1	Factor 2	Factor 3	h^2 [a]
29	If given the chance, my child would drink continuously throughout the day				0.11
30[c]	My child cannot eat a meal if s/he has had a snack just before				0.20
31	If given the chance, my child would always be having a drink				0.16
32	My child is interested in tasting food s/he hasn't tasted before		0.78		0.60
33	My child decides that s/he doesn't like a food, even without tasting it		0.77		0.59
34	If given the chance, my child would always have food in his/her mouth	0.56			0.49
35[d]	My child eats more and more slowly during the course of a meal				0.29
	Indices				
	Eigenvalue	5.92	3.97	3.83	
	Alpha (α)	0.89	0.93	0.84	
	Omega (ω)	0.89	0.93	0.85	

Note: Scoring Instructions: Reward-based eating: Mean of items 1,3 (reverse), 4 (reverse), 5,8 (reverse),12,14,19,20,22,28,34. Picky eating: Mean of items 7,10,16,24,32,33. Emotional eating: Mean of items 2,9,13,15,23,25.

[a] h^2 (communality) is an estimate of the proportion of item variance the item contributed to the total variance explained by the three-factor model.

[b] Item 3 loaded negatively despite content being related to Factor 1. This item was retained as both loading and communality inclusion criteria were met, but further investigation in future psychometric studies is warranted.

[c] Items 27 and 30 were removed for low discriminatory ability of the items.

[d] Item 35 was removed for containing unrelated content to Factor 1.

TABLE 3

Factor intercorrelations and descriptive information

	Factor 1	Factor 2	Factor 3
Factor 1	1.00	–	–
Factor 2	0.02	1.00	–
Factor 3	0.12	0.08	1.00
Mean	3.56	3.07	2.40
SD	0.45	0.25	0.80