

Development of “The Child Eating-Enjoyment Scale”

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Abstract

The purpose of this study was to develop a scale to measure whether children appear to be enjoying a meal. The subjects of the study were 944 parents who had children attending preschools in Tokyo. In September 2009, we distributed self-report questionnaires to a cross-sectional sample. We asked subjects to respond to seven items that address whether children appear to be enjoying a meal. The items were selected and the data were analyzed using exploratory and confirmatory factor analyses, and the reliability (Cronbach's *alpha*) and validity of the scale were assessed. The final analysis included (after the exclusion of some respondents) 526 participants, and the effective response rate was 94.4%. An instrument consisting of four items addressing whether a child appears to be enjoying a meal was extracted from the data. These four items were “My child smiles during mealtimes”; “My child says ‘It’s delicious’ when he/she is eating”; “My child says ‘I like this’ when he/she is eating”; and “My child shows interest in food during mealtimes (e.g., he/she says, ‘What is this?’).” The internal consistency (Cronbach's *alpha*) of this scale was 0.79. We also investigated the association between total score on the scales and the categories of “picky eating,” “unbalanced diet,” “light eating,” “appetite,” and “concentration during mealtime”. The reliability and validity of this scale were confirmed. As all items in this study relied on self-reports, a study that uses an objective index will be necessary. The strength of this scale is that it is easy to use and evaluate because it consists of only four items.

Keywords: child, meal, scale development

1. Introduction

1.1 Introduction of the Problem

In Japan, one goal of food education in preschools is to produce “the child who enjoys eating.” In March 2004, the Ministry of Health, Labour, and Welfare published *The Child Who Enjoys Eating—A Guide about Food Education in Preschool* (Ministry of Health, Labour and Welfare, 2004). Consequently, we have been asked to increase interest in meals by enhancing the experience of eating and offering food education that develops basic healthy eating habits. However, at present, increasing numbers of children eat meals alone (Ministry of Health, Labour and Welfare, 2005). As a result, children eat balanced meals less frequently and are less likely to learn appropriate eating-related etiquette (Neumark-Sztainer, Wall, Story, & Fullerson, 2004). In addition, it has been reported that children's enjoyment of meals is decreasing and that this is linked to poor physical and mental health (Sassa, Kato, Tanaka, & Tokida, 2003). Adachi, who first reported the tendency of primary school students to eat alone, studied eating habits in 1982. In that study, primary school students drew a picture of the foods they ate for breakfast and dinner, the atmosphere during mealtimes, and their feelings during mealtimes. The results of this research indicated that many children ate meals alone. Adachi conducted the same study in 1991 and 1999 and reported that eating alone was increasing and that, despite the surplus of food in Japan, the quality of the meals eaten by children was low. Additionally, children who ate alone expressed feelings of malaise related to food and experienced meals as less fun than did children who ate with their family (Adachi, 2000). Thus, caregivers should attempt to ensure that children enjoy their meals.

There are several additional reasons to emphasize the enjoyment of eating, including the importance of enjoyable childhood mealtimes, which was underscored by the research conducted by Ainuki and Akamatsu (Ainuki, Akamatsu, Hayashi, & Takemi, 2013). That study asked adults about enjoyable eating experiences during

childhood as well as about their present eating behavior. Eating a balanced diet of three meals per day, eating vegetables, and a high score on the Subjective Diet-related Quality of Life (SDQOL) test were positively associated with enjoyable childhood mealtimes. Thus, the experience of enjoyable childhood mealtimes is linked to healthy eating habits and higher-quality meals in adulthood. In another study, targeting university students, the experimental group that experienced enjoyment related to a food immediately after eating it reported more memories of enjoyment compared with a control group that considered other things after eating (Robinson, Blissett, & Higgs, 2012). The same study found that the intake of the food on the following day increased in the experimental group relative to the control group. Thus, this study suggested that memories of the enjoyment of eating increase the appeal and intake of food. Picky eating and an unbalanced diet are problems about which many parents worry, and it has been reported that ~50% of children eat an unbalanced diet (Carruth, Ziegler, Gordon, & Barr 2004). Another study of the relationship between picky eating and enjoyment of meals showed that a child eating an unbalanced diet reported decreased enjoyment of the meal in question (Klazine, 2012). Enjoyment of eating in early childhood—when dietary habits and food likes and dislikes are established—is one of the factors that establishes favorite foods.

The aforementioned studies underscore the importance of children's enjoyment of eating in terms of their psychological and physical health and the potential contribution of the lack thereof to the development of problems (e.g., picky eating, eating an unbalanced diet). Previous studies have found that it is important that adults to enjoy their meals (Satter, 2007), and Satter et al. developed the Satter Eating Competence Model (ecSatter) to measure eating competence in adults (Satter, 2007). The subscales related to eating attitudes address whether adults enjoy food and eating. However, no such scale has been developed for children thus far. Indeed, it may be difficult for an adult to assess the enjoyment experienced by a child during eating based only on appearances. Yet, the development of such an evaluation method would contribute to this research domain and to the development of interventions to help children enjoy eating.

In this study, we asked mothers about whether their ≥ 3 -year-old children attending preschool appeared to enjoy their meals. The purpose of the study was to develop a scale to measure whether children appear to enjoy a meal and to evaluate its reliability and validity.

2. Method

2.1 Summary of Survey

In July 2009, we sent a questionnaire and documents explaining the purpose and methods of this study to 10 preschools in Tokyo, Japan. We asked the head teacher of each preschool to confirm the contents of the questionnaire and to examine its validity. Then, we improved the questionnaire based on this feedback. At the same time, five mothers who were not subjects in this study completed the questionnaire to confirm its face validity. After receiving permission from all preschools, we distributed self-administered questionnaires to a cross-section of 944 parents whose children attended these preschools.

Questionnaires were sent to each preschool and then distributed to the subjects, who completed their questionnaire in their home. All potential respondents were informed of the voluntary nature of participation, and we considered the return of the questionnaire as informed consent. In households with more than two children attending preschool, we asked for answers pertaining to the youngest child. We placed collection boxes at each preschool to collect the completed questionnaires, which were returned by the head teachers. The Ethics Committee of Ochanomizu University approved this study.

2.2 Question Items

2.2.1 Appearance Enjoyment of a Meal

Items pertaining to the appearance that children were enjoying a meal were developed based on the results of group interviews and individual interviews with mothers (Ainuki & Akamatsu, 2012). These mothers had preschool children who attended the various preschools involved in this study. Subsequently, three researchers discussed and identified seven items related to the apparent enjoyment of a meal.

The questionnaire contained the following seven items about the appearance that their children were enjoying a meal: (1) "My child says 'I like this' when he/she is eating;" (2) "My child smiles during mealtimes;" (3) "My child asks for another serving at mealtimes;" (4) "My child says 'It 's delicious' when he/she is eating;" (5) "My child eats everything on his/her plate when eating;" (6) "My child shows interest in food during mealtimes (e.g., he/she says, 'What is this?');" and (7) "My child eats by himself or herself." Items were rated on the following five-point scale: (1) "not at all;" (2) "rarely;" (3) "sometimes;" (4) "often;" or (5) "every time."

2.2.2 Appearance during Mealtimes and Eating Habits

The items pertaining to children's reactions during mealtimes and their eating habits were developed based on observations of children during interviews that were conducted before/during the development of these items. The items regarding "picky eating," "unbalanced diet" and "light eating" were developed with reference to previous studies (Galloway, Lee, & Birch, 2003; Dovey, Staples, Gibson, & Halford, 2008; Steyn, Nel, & Natntel, 2006).

Participants responded using the abovementioned five-point scale (not at all-every time) to the following items: "My child does not eat foods that he/she dislikes" (picky eating); "My child eats only the same foods during mealtimes" (unbalanced diet); "My child does not eat very much at mealtimes" (light eating); and "My child is absent-minded during mealtimes" (concentration). To assess appetite, participants responded using a four-point scale ("slightly," "not much," "mostly good," "good every time") to the "How is your child's appetite during mealtimes?"

2.2.3 Sociodemographic Characteristics

Participants were asked about their age, employment, and number of children. In addition, they were asked about the gender and age of their children.

2.3 Data Analysis

Data from mothers with at least one child 3 years or older were analyzed according to the following procedure: responses to items pertaining to the appearance that children were enjoying meals were subjected to exploratory factor analysis (EFA), confirmatory factor analysis (CFA), an examination of reliability, and an examination of criterion-referenced validity.

We calculated the frequency distribution of each item regarding apparent eating enjoyment and confirmed whether more than 75% of participants agreed on any one item (Urakami & Wakita, 2008). Next, we randomly divided the subjects into two groups to perform factor analysis; one ($n = 263$) was subjected to EFA, and the other ($n = 263$) was subjected to CFA. We displaced the deficit of each item to the median and carried out EFA using the seven items regarding the appearance that children were enjoying a meal. We used a generalized least-squares approach to the EFA with a promax rotation. Based on the EFA, we selected items with no loading of < 0.35 on multiple factors (Oshio, 2010). Using the selected factors, we performed CFA to evaluate construct validity. The fitness of the model was assessed using the following indices: goodness-of-fit index (GFI), adjusted GFI (AGFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). GFI, AGFI, and CFI values higher than 0.90 defined an acceptable fit, whereas values higher than 0.95 defined a good fit. RMSEA values lower than 0.10 defined an acceptable fit, and those lower than 0.05 defined a good fit (Oshio, 2008).

The reliability and validity were analyzed based on data from all subjects ($n = 526$). To assess internal consistency, Cronbach's *alpha*, was used to examine the reliability of the scale. To assess the criterion-referenced validity of this instrument, a one-way analysis of variance, and Tukey's multiple comparison test was performed to examine differences between the total score on the scale and that on each item. Analyses were conducted using IBM SPSS statistics version 19.0 and Amos version 19.0. Statistical significance was set at $p < 0.05$.

3. Results

3.1 Sociodemographic Statistics

Of the 944 potential participants, 557 returned questionnaires (return rate: 59.0%). We explored data from 526 mothers with children aged 3 years or older (a good response rate: 94.4%). Most respondents were aged 36-40 years (238 [45.4%]; Table 1). The sex of the children was distributed evenly (259 [49.3%] males, 238 [50.7%] females). The mean age of the children was 4.6 (SD 0.9) years.

Table 1. Characteristics of the participants and their children

Characteristic	N	%
Mother 's age (years)		
21–25	4	0.8
26–30	36	6.9
31–35	150	28.6
36–40	238	45.4
40>	96	18.3
Employment status of mother		
Employed	155	29.5
Not employed	371	70.5
Child 's gender		
Male	259	49.3
Female	266	50.7
Child 's age		
3		
4	78	14.8
5	160	30.4
6	202	38.4
	86	16.3
Siblings		
One	110	21.3
Two	301	58.3
Three	96	18.6
Four	9	1.7

3.2 Exploratory Factor Analysis and Confirmatory Factor Analysis

Exploratory factor analysis was performed among 50% ($n = 263$) of the subjects who had been randomly selected from the total sample of 526. In this analysis, we confirmed the frequency distributions for the seven items. There were no items on which 75% or more of the respondents agreed.

Therefore, we performed EFA using all seven items on the scale (Table 2). The factor loadings of all items were higher than 0.35, the standard of rejection, and we thus obtained seven items and one factor.

Next, we performed CFA using the seven items on the scale to consider the construct validity of the model suggested by the EFA. In this analysis, we used the remaining 50% of the subjects. We did not obtain the goodness-of-fit index value, so we developed the model by confirming the error correlation and the contents of the seven items. We obtained the goodness-of-fit index with a model consisting of four items (“My child smiles during mealtimes;” “My child says ‘It’s delicious’ when he/she is eating;” “My child says ‘I like this’ when he/she is eating;” and “My child shows interest in food during mealtimes (e.g., he/she says, ‘What is this?’). We inserted an error correlation between “My child smiles during mealtimes” and “My child says ‘It’s delicious’ when he/she is eating” (GFI: 0.999, AGFI: 0.992, CFI: 1.000, RMSEA: 0.000). The results of the four items and one factor are presented in Table 2.

Table 2. Exploratory factor analysis (EFA) of “the appearance that a child enjoys a meal” scale

Items pertaining to the appearance that a child enjoys a meal	Exploratory factor loading	Confirmatory factor loading
My child smiles during mealtimes.	0.79	0.48
My child says “It’s delicious” when he/she is eating.	0.78	0.70
My child says, “I like this” when he/she is eating.	0.66	0.75
My child shows interest in food during mealtimes (e.g., he/she asks, “What is this?”).	0.66	0.61
My child eats by himself or herself.	0.60	-
My child asks for another serving at mealtimes.	0.55	-
My child eats everything on his/her plate when eating.	0.53	-

Note. Factor sampling method: maximum-likelihood estimation

seven items, 1 factor: Cronbach’s $\alpha = 0.81$, dispersion explanation rate = 39.4%

four items, 1 factor: Cronbach’s $\alpha = 0.79$, dispersion explanation rate = 48.6%

3.3 Examination of Reliability

We calculated Cronbach’s *alpha* coefficient to examine the reliability of the scale. The Cronbach’s *alpha* coefficient was 0.79, confirming the reliability (Table 2).

3.4 Criterion-Referenced Validity

The mean total score of the scale was 15.7 (*SD* 2.7); the minimum score was 7.0, and the maximum score was 20.0. A comparison of the mean total scores by sex revealed that the mean score of males was 15.6 (*SD* 2.7) and that of females was 15.8 (*SD* 2.6), which reflected no significant difference. In terms of the age of the child, 3-year-olds obtained a mean score of 15.4 (*SD* 3.0), 4-year-olds obtained a mean score of 15.8 (*SD* 2.7), 5-year-olds obtained a mean score of 16.0 (*SD* 2.6), and 6-year-olds obtained a mean score of 15.4 (*SD* 2.6); again, no significant differences were observed.

The associations between scores for picky eating, unbalanced diet, light eating, appetite, and concentration during mealtimes and total scores were determined. The results are presented in Table 3.

A one-way analysis of variance revealed a difference in the mean total score of the scale and the scores for picky eating ($p < 0.001$). According to Tukey’s multiple comparison test, the total scores of those who responded “every time” to this question were significantly lower than were those who endorsed the other four responses. In other words, children who ate foods they disliked enjoyed eating.

A significant relationship was also found between the mean total scores and those for eating an unbalanced diet ($p < 0.001$). According to Tukey’s multiple comparison test, the total scores of those who responded “every time” were significantly lower than were those who responded “sometimes,” “rarely,” or “not at all.” “Often” received significantly fewer endorsements than did “rarely” and “not at all.” “Sometimes” received significantly fewer endorsements than “rarely” and “not at all.” In other words, children who did not have an unbalanced diet and ate different foods enjoyed eating.

A similar difference was also observed with regard to light eating ($p < 0.001$). According to Tukey’s multiple comparison test, the total scores of those who responded “every time” were significantly lower than were those who responded “not at all,” “rarely,” and “sometimes.” “Often” and “sometimes” received significantly fewer endorsements than did “not at all” and “rarely.” In other words, children who ate a lot experienced greater enjoyment while eating.

Participants responded with one of four choices to the item regarding their child’s appetite during mealtimes; however, there was a deflection in the distribution so we combined “light appetite” (2, 0.4%) and “not very much appetite” (63, 12%), yielding a total of three response groups. The one-way analysis of variance for this question revealed a significant difference with the mean total scores ($p < 0.001$). Tukey’s multiple comparison test

indicated that the total scores of those who responded, “every time” were significantly higher than were those for each of the other two groups. In other words, children with an appetite took greater enjoyment in eating.

The one-way analysis of variance also revealed a significant difference regarding concentration during mealtimes ($p < 0.001$). According to Tukey’s multiple comparison test, the total scores of those who responded “every time” were significantly lower than were those who responded “not at all.” “Often” was endorsed by significantly fewer respondents than were “not at all” and “rarely,” and “sometimes” was endorsed by significantly fewer respondents than was “not at all.” In other words, children who concentrated on eating during mealtime enjoyed eating.

Table 3. Criterion-referenced validity of the scale

	N	%	Mean score [†]	SD	ANOVA* p
Picky eating					
My child does not eat foods that he/she dislikes when eating.					
Total					
Not at all	525	100.0	15.7	2.7	
Rarely	36	6.9	16.8 ^{abc}	2.8	
Sometimes	88	16.8	16.3 ^{ade}	2.6	< 0.001
Often	159	30.3	15.9 ^{bdf}	2.6	
Every time	135	25.7	15.9 ^{cef}	2.6	
Total	107	20.4	14.4	2.6	
Unbalanced diet					
My child eats only the same foods during mealtimes.					
Total					
Not at all	526	100.0	15.7	2.7	
Rarely	33	6.3	17.3 ^a	2.1	
Sometimes	78	14.8	17.0 ^a	2.3	< 0.001
Often	175	33.3	15.9 ^b	2.5	
Every time	181	34.4	15.2 ^{bc}	2.8	
Total	59	11.2	14.7 ^c	2.6	
Light eating					
My child does not eat very much at mealtimes.					
Total					
Not at all	525	100.0	15.7	2.7	
Rarely	60	11.4	17.1 ^a	2.8	
Sometimes	147	28.0	16.6 ^a	2.6	< 0.001
Often	206	39.2	15.4 ^b	2.6	
Every time	85	16.2	14.7 ^{bc}	2.6	
Total	27	5.1	14.0 ^c	2.6	
Appetite					
How is your child ‘s appetite during mealtimes?					
Total					
Has an appetite every day	522	100.0	15.7	2.7	
Has an appetite generally	91	17.4	17.4 ^a	2.3	
Has little/not very much appetite	366	70.1	15.7 ^b	2.5	< 0.001
Total	65	12.5	13.7 ^b	2.7	
Concentration during mealtimes					
My child is absent-minded during mealtimes.					
Total					
Not at all	523	100.0	15.7	2.7	
Rarely	117	22.4	16.5 ^a	2.6	
Sometimes	198	37.9	15.8 ^{abc}	2.5	< 0.001
Often	139	26.6	15.6 ^{bde}	2.5	
Every time	54	10.3	14.6 ^{df}	3.0	
Total	15	2.9	14.3 ^{cef}	3.1	

Note. † Different letters (a-f) indicate significant differences according to Tukey ‘s multiple comparison test ($p < 0.05$).

* One-way analysis of variance

4. Discussion

In this study, we developed and confirmed the reliability and validity of The Child Eating-enjoyment scale, which is composed of four items and one factor.

The content validity of the items of the scale was confirmed, and the four items of the scale were related to the items on the ecSatter; however, three of four items on the scale referenced a remark attributed a child. The Eating Competence Model developed by Satter et al. is composed of four subscales that measure eating competence in adults (Satter, 2007). One of the subscales, "Eating Attitudes" (e.g., "I enjoy food and eating;" "I am relaxed about eating;" "I am comfortable with my enjoyment of food and eating") asks whether people enjoy their meal. Thus, the scale used in this study is considered to have content validity.

Our examination of the criterion-referenced validity investigated relationships between the appearance that children were enjoying meals and picky eating, eating an unbalanced diet, being a light eater, appetite, and concentration during mealtimes. According to the results, the validity of this scale was confirmed.

Responses to the picky-eating subscale revealed that children who ate foods that they disliked had higher total scores on this scale compared with children who did not eat such foods. This result is consistent with the inference that children who eat disliked foods enjoy their meals and with a report suggesting that children who eat even disliked foods looks forward to three meals (Tsuzimoto & Okuda, 2009). Thus, it is important to enjoy foods without prejudice about certain food.

The light-eating subscale measured the quantity of food eaten. The results showed that children who ate only a small quantity of food were not interested in eating and food, whereas children who ate a larger quantity were interested in eating and food and also ate many types of food. Jansen et al. reported that children who do not enjoy eating tend to have low weight, which corresponds with the results of this study (Jansen et al., 2012). These results indicate that a child who is interested in food and eats a larger quantity of it enjoys eating. Similar results were obtained by the subscales addressing an unbalanced diet, appetite, and concentration during mealtimes.

The present study had several limitations that should be acknowledged. The first is that all responses to items were self-reported. Thus, the answers may differ slightly from actual appearances during mealtimes and from actual eating habits, because they were based on mothers' reports. However, the statistical analysis did not reveal inconsistent answers. Thus, it is suggested that the answers were appropriate. The second limitation is that we did not confirm the reliability by the test-retest method. Despite these limitations, we developed a scale for assessing the appearance that a child enjoys a meal, the first such scale developed to date, and confirmed its reliability and validity. Thus, our findings are important.

The strengths of this scale are that it is easy to use and evaluate, because the appearance of a child enjoying a meal is measured by four items. We expect that this scale will be used for evaluating the effects of food education and for planning food educational programs that are better matched to the actual eating habits of children. Additionally, those who prepare and serve children's meals need to attend not only to the food that the children eat but also to the children's appearance during mealtimes. This study developed and confirmed the reliability and validity of The Child Eating-enjoyment scale, which consists of four items and one factor.

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