Snack Consumption and Waste by Preschool Children Served “Cute” versus Regular Snacks

LAUREL BRANEN, PhD, RD, LD; JANICE FLETCHER, EdD; LESLIE HILBERT, MS

1School of Family and Consumer Sciences, College of Agriculture, University of Idaho, Moscow, Idaho 83844–3183; 2Office of Admissions, Colorado State University, Fort Collins, Colorado 80526–0015

ABSTRACT

Objective: To determine if preschool children would eat and waste different amounts of food when served snacks in a regular versus a “cute” form.

Design: Preschool children were served 6 snacks in a cute form and the same snacks in a regular form using the same food components during 24 snack sessions. Children served as their own controls.

Subjects/Setting: Thirty-nine children ages 36 to 60 months (20 girls, 19 boys) in a university child development laboratory.

Main Outcome Measures: Snack portions eaten and wasted and time for eating.

Analysis: Data were analyzed using a 2 × 6 factorial analysis of variance, with snack form (cute or regular) and snack components as the 2 factors.

Results: There was no significant difference in children’s snack consumption or waste between cute and regular versions of snacks. It took children an average of 2 minutes longer to eat the cute snacks.

Conclusions and Implications: There is no apparent advantage to serving cute snacks in terms of increased consumption or decreased waste. Further research should be conducted on children’s mealtime behaviors when served cute foods to learn more about children’s responses to the overall appearance of their food.

KEY WORDS: food intake, preschool children, feeding practices

INTRODUCTION

Foods prepared for children are sometimes made to resemble familiar objects such as clowns and bunnies. Recipes for these “cute” foods can be found in a wide variety of publications targeted at parents and child care providers, ranging from magazines1-4 to cookbooks5,6 and even textbooks.7 These imply that serving cute foods, such as bunny buns or clown English muffins, will enhance children’s interest in the food, encourage them to eat more, and create a more enjoyable eating atmosphere.2,3 It is also suggested that the enhanced appearances allow adults to “sneak” foods into the child’s diet so that the child will consume foods he/she might otherwise reject.2 Interestingly, many of the recipes in these magazines and cookbooks are for sweet foods, which children will generally eat with no encouragement.

Although articles about preparing cute foods indicate that children will eat more of these foods, the opposite may actually be true. Changing the appearance of the food may elicit a neophobic response.8 For example, a child who eats peanut butter and celery separately may need to be served the peanut butter on celery 10 or more times before accepting it.9 Despite the many recommendations to use the appearance of foods to increase children’s consumption, a comprehensive review of related literature found little research to support this method. In fact, because the focus of the cute foods is external, the practice may impact the child’s ability to recognize and respond to internal cues of hunger and satiety.10

The purpose of this study was to determine if there were differences in consumption, waste, and time to eat when children are served foods in a regular form and a cute form.

INTERVENTION AND EVALUATION

Subjects

Participants were children attending 2 preschool sessions at a university child development laboratory. The 19 children (11 girls, 8 boys) in the morning session were between the ages of 36 and 48 months. The 20 children (9 girls, 11 boys) in the afternoon session ranged in age from 48 to 60 months.
The children were predominantly white, with one child each of Korean, Chinese, Middle Eastern, Native American, or African descent. Each child was from a family with income above the United States poverty guidelines. A physician’s report of health status was on file for each child, including height, weight, and hematocrit. All children were within the normal ranges for these measures.

To ensure the rights of the children, the study was approved by the University Human Assurances Committee, and all of the children in the child development laboratory had parental permission to be participants in the study. Communication about research activities and children’s eating behaviors was frequent among researchers, parents, and teachers.

**Procedure**

We selected 6 cute snacks for the study: porcupine salad (tuna salad with pretzel quills), bagel baseballs (bagels and cream cheese with American cheese laces), apple smiles (apple wedges and peanut butter with marshmallow teeth), dominoes (cereal bars decorated with frosting), snaky snacks (biscuit breadsticks with cheese stripes), and muffin faces (English muffins and peanut butter with fruit decoration). Although most snack components had been served in the child development laboratory, these were not typical snacks. We selected them for this study because they represented a variety of foods: breads, fruit, fish, sweets, etc. Second, they were frequently included in articles promoting cute foods. Finally, the components were all familiar to the children so we would not have a confounding factor of familiar versus nonfamiliar foods. The service order of the snacks was determined in consultation with a university statistician. First, a random service order was determined based on the 6 major food components and repeated since each food would be served twice (cute form and regular form). Then the cute and regular snacks were assigned to alternating days throughout the study. The same snacks were served in the morning and afternoon sessions. The regular and cute versions contained all of the same components in the same proportions. The snacks were served in predetermined portions, with portion cups being used when necessary.

The foods were planned and prepared on site by one of the researchers and student teachers, who usually prepare the snacks. The portion sizes were determined according to the US Department of Agriculture’s Child and Adult Care Food Program (CACFP) guidelines, although the child development laboratory is not a CACFP participant.

In keeping with the child development laboratory’s philosophy of feeding young children, a satiety feeding protocol was used, whereby children were allowed to eat as many portions as they wished but could take only one portion at a time. Adults determined what was served; the children chose how much they ate. In addition, the children served themselves.

The children were observed during snack time, which occurred at the midpoint of the 2.5-hour preschool sessions. One group of children was observed during the morning session and a different group was observed during the afternoon session. Three to 7 children were seated at each of 4 tables with 1 teacher. The children sat at the table of their choice or could choose not to participate in the snack session. The mealtime setting was not altered during the study, and data collection was designed to have a minimal impact on the environment.

Prior to the present study, a pilot study was conducted using children not in the current study. The pilot study allowed the researchers to evaluate potential snacks and to familiarize the research team with the data collection procedures described below. During the pilot study, the method of data collection was finalized, the data form was developed, and the snacks for the study were determined.

**Data Collection**

University students majoring in child development, psychology, and nutrition carried out data collection. They were trained and supervised by the research coordinator. Data collectors were stationed at the periphery of the eating area and did not engage in conversation with the children or teachers. If the children tried to engage the data collectors, they replied, “I am working today.” If the children questioned further, they were directed to consult the teachers.

One data collector was assigned to observe each table. The number of snacks taken and wasted by each child were recorded. To assist in quantifying the portions wasted, standard amounts for full, three-quarter, one-half, and one-quarter portions were determined by the researchers for each snack prior to each data collection session.11 The time elapsed for the snack was measured for each table from the seating of the first child to the departure of the last child. The total time for each table was recorded at every meal session.

Interobserver reliability of the data collectors was measured using the procedure outlined by Touliatos and Compton.12 Two data collectors observed the same group of children on 5 occasions. The number of agreements in their observations was divided by the total number of observations. Average reliability was .93 for the portions taken and .89 for the portions wasted.

**Data Analysis**

Data were analyzed using SPSS (SPSS, Inc, 1997, Chicago, Ill). Individual portion intake, individual waste, and the group time for eating were analyzed using a 2 × 6 factorial analysis of variance (ANOVA), with form of food and snack components as the two factors. Where there was no interaction, the main effects were examined and multiple comparisons were done using the Scheffé test to determine significant differences. Significance was set at P < .05.
RESULTS AND DISCUSSION

All children were present for each of the 12 tasting sessions. We combined the data from all of the children for the final analyses since there was no significant difference in the results between the two groups.

Consumption

The average number of portions of each type of snack consumed by the children is presented in Table 1. The average number of portions of regular snacks consumed was 0.8 ± 0.8, and the average number of portions of cute snacks consumed was 0.8 ± 0.9. Based on a 2 × 6 factorial ANOVA, there was no significant interaction of form (regular and cute) and main snack component (apple, bagel, biscuit, cereal bar, English muffin, and tuna) or a main effect of form. There was a significant main effect of snack component on consumption (F = 7.82, df = 5, P < .05). A subsequent multiple comparisons test on the snack components revealed that the children consumed significantly more cereal bars than tuna, English muffins, and biscuits. They also consumed significantly more bagels than tuna, English muffins, and biscuits, as well as significantly more apples than English muffins and biscuits.

We included a sweet food because articles on cute foods often contain recipes for cute desserts. Regardless of form, the cereal bars were consumed in the highest amount. Owing to the sweet nature of the cereal bars and the innate preference for sweets, this result might be anticipated. The tuna salad was the least consumed regular snack, and its cute counterpart, the porcupine salad, was the least consumed overall. The cute appearance of the tuna did not entice the children to eat more.

Waste

The average level of waste across all snacks ranged from approximately one third to three fourths of a portion (see Table 1). The average number of regular and cute snacks wasted was 0.5 ± 0.6 portions for each form. Based on a 2 × 6 factorial ANOVA, there was no significant interaction of form (regular and cute) and main snack component (apple, bagel, biscuit, cereal bar, English muffin, and tuna) or any significant main effects. These results indicate that making the cute snacks did not increase waste.

During the pilot study, children regularly took snacks that they played with or examined but did not eat. It was theorized that the appearance of the cute snacks might entice the children to take snacks they would not eat, resulting in more waste. However, during the study, there was no significant difference in waste or consumption, so it can be deduced that the children took a similar number of snacks from the serving tray regardless of appearance. Thus, the cute appearance did not significantly impact the amount of the snack the children elected to serve themselves.

Time to Eat the Snacks

The average time taken for the children at each table to eat the snacks ranged from 12 to 21 minutes. The mean time taken to eat the regular snacks was 16 ± 5 minutes, and the mean time taken to eat the cute snacks was 18 ± 7 minutes. Based on a 2 × 6 factorial ANOVA, there was a statistically significant interaction of form (regular and cute) and food component on the time to complete the meal (Table 2). Of the 6 foods, the children took longer to eat 4 of them in the cute form (tuna, cereal bars, bagels, apples), whereas they took longer to eat the English muffins in the regular form. The consumption time was equal for the biscuits.

For the groups of children, the snacks with cute appearances took an average of 2 minutes longer to complete. The practical significance of this difference would vary based on the number of children to be served and the number of service times. Although the time difference is only an 11%
increase, it might have an impact when serving multiple groups of children.

Of greater practical significance was the time required to assemble the snacks. The researchers noted that the time to make the snacks into the cute forms was up to 4 times longer than for the regular form, a potential concern for staffing in child care facilities.

**IMPLICATIONS FOR RESEARCH AND PRACTICE**

This research reveals that altering the appearance of snack foods does not significantly impact children’s consumption levels. The food components of the snacks had a greater impact on consumption than did the appearance of the snack. Thus, there appears to be no consumption/waste advantage to making cute foods. Second, there appears to be no consumption problem with making the appearance of food cute if one wants to and has the time. However, the time investment may be too great, especially when serving large groups.

We recommend continued research on factors affecting young children’s eating behaviors. Repetition of this study with novel foods would help determine if cute foods affect the number of exposures needed to diminish the neophobic response. Further, observing the mealtime behaviors of children when served the cute foods would be important in learning more about children’s responses to the overall appearance of their food.

**REFERENCES**


---

**Table 2. Analysis of Variance of the Time Taken for 3 and 4 Year Olds to Eat the Snacks**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form of snack (F)</td>
<td>1</td>
<td>400.17</td>
<td>400.17</td>
<td>11.77**</td>
</tr>
<tr>
<td>Major snack component (C)</td>
<td>5</td>
<td>1024.45</td>
<td>204.89</td>
<td>6.03**</td>
</tr>
<tr>
<td>F × C</td>
<td>5</td>
<td>790.29</td>
<td>158.06</td>
<td>4.65**</td>
</tr>
<tr>
<td>Residual</td>
<td>413</td>
<td>14 038.3</td>
<td>33.99</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>424</td>
<td>16 179.4</td>
<td>38.16</td>
<td></td>
</tr>
</tbody>
</table>

**P < .001.**
Form indicates regular or cute; major snack component indicates tuna salad, bagel, apple, cereal bar, breadstick, or muffin.