Food Choices of 4 to 6-Year-Old Overweight and Nonoverweight Children While Role-Playing as Adults

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The following study compared the food choices made by overweight and non-overweight preschoolers while role-playing a mother who bought food for a family, and examined the influence of maternal restriction on food choice. After screening 619 children for height and weight, 56 overweight children (equal sex distribution, ages 4-6) and 56 non-overweight children (matched on age, sex, demographics) were selected to participate. Children’s purchases of low and high caloric snacks, drinks, and dinner products in a miniature supermarket were recorded. Mother and child-reported maternal restriction were assessed using the Child Feeding Questionnaire (CFQ) and the Kid’s CFQ. Compared to non-overweight children, overweight children choose more high-calorie foods when role-playing a mother. Maternal restriction did not differ between overweight and non-overweight children. Both children’s and mothers’ reported maternal restriction were unrelated to food choices and there were no significant interactions between restriction and weight status on food choices. In conclusion, while parental restriction seems to be unrelated to children’s food choices, family food patterns might have great impact already at young ages.

Keywords: overweight, children, food choices, restriction, parenting

Environmental factors may play an important role in the development of overweight since genetic factors alone cannot account for its worldwide rapid increase in the past decennia (Faith et al., 2004). For children, an environment of particular interest is the family in which a child grows up. Children like and eat what is familiar and eating habits are formed through repeated exposure to certain foods (Birch & Fisher, 1998; Verplanken & Faes, 1999). Family food purchases therefore not only determine immediate childhood obesity risk but may also influence food cognitions and habits and therefore affect food habits and health throughout life (Kelder, Perry, Klepp, & Lytle, 1994; Ransley et al., 2003). For example, daughters of parents who had an unhealthy lifestyle also had more energy from fat intake and showed a greater increase in BMI over time compared to families in which parents reported a healthier diet and physical activity pattern (Krahnsstoever-Davison, Francis, & Birch, 2005). Besides other factors, such as genetic susceptibility, children’s weight status seems to mirror the dietary habits within their family.

To study these mirrored processes in young children we used the innovative design of Dalton et al. (2005) who conducted an observational study of 120 preschoolers who were asked to role-play adults and go shopping in a doll supermarket. Significant relations between parents’ alcohol and cigarette use and children’s purchases of these products were found (Dalton et al., 2005). Using the same setting, Sutherland et al. (2008) found that number of healthy and unhealthy food purchases were positively associated with the parents’ food choices on a questionnaire. Behavioral responses are thus appropriate and valid for this age and developmental stage.

Parents influence on their children’s eating not only through the food they provide but also by their parenting behaviors, such as monitoring, pressure to eat, and restriction. Restriction of children’s eating has most frequently been the topic of research and debate, resulting from contrary results about the relation with children’s food intake and weight status (see reviews by Clark, Goyder, Bissell, Blank, & Peters, 2007; Wardle & Carnell, 2007). Regardless, mothers are believed to play a more central role in children’s eating behaviors compared to fathers (Hannon, Bowen, Moinpour, & McLerran, 2003; Vereecken, Keukeler, & Maes, 2004) and overweight children have been found to be subject to more restriction. Based on the literature, the current study, the present study hypothesized that overweight preschoolers’ would choose more high caloric foods than non-overweight peers while role-playing a mother who buys food for her family. It was also hypoth-
esized that the associations between child weight status and their food choices are moderated by parental restriction.

**Methods**

**Participants and Selection**

The scientific committee of the Behavioral Science Institute (BSI) of the Radboud University Nijmegen granted permission to carry out the present study. Respondents were children in the first 2 classes of 13 primary schools (response rate: 22%) in the eastern part of the Netherlands. Parents were informed and given the opportunity to refuse participation, which one parent did. From the other 619 preschoolers, weights and heights were measured using a portable stadiometer and a weighing scale, according to standard procedures. Those children whose mothers completed the questionnaire (470 children; 76%) formed the role-play selection group. Children’s mean BMI was 16.2 (SD = 1.5) and 89 children (18.9%) were overweight according to age and sex specific BMI cut-off points (Cole, Bellizzi, Flegal, & Dietz, 2000). This number was higher than anticipated; therefore, for participation in the role-play, we made a further selection based on age (≥ 4), two parent families, and school. Overweight children were matched within their schools to non-overweight children based on age, sex, ethnicity, number of children in the family, educational level of their parents, and hours of paid employment per week of both parents.

The final selection included 56 pairs of children with 28 pairs of boys and 28 pairs of girls. Participating children were between 4 years and 2 months and 6 years and 8 months old with a mean age of 5.5 years (SD = 0.62). Mean BMI of the overweight group was 18.5 (SD = 1.0) and mean BMI of the non-overweight group was 15.3 [SD = 0.8; t(112) = 18.76, p < .001]. Self-reported height and weight of the mothers yielded a mean BMI of 24.3 (SD = 3.85), with one-third of the mothers being overweight (33%). In the group of overweight children, a higher percentage of mothers (46.2%) were overweight compared to the non-overweight children’s mothers (23.2%) [χ²(1) = 6.30, p < .05]. Seventy-five percent of mothers and 11% of fathers had a low education level [elementary school or low (vocational) education], 25% and 73% of the mothers and fathers, respectively, had average educational levels (secondary education or intermediate vocational education), and 17% of the fathers had high educational levels (college or university).

**Materials**

**Mother questionnaire.** Mothers’ questionnaires consisted of a general part including socio-demographic information, height and weight questions, and a Dutch translation of the restriction subscale of the 8-item Child Feeding Questionnaire (Birch et al., 2001). Cronbach’s alpha appeared to be low for the CFQ-restriction scale (α = .38 in the total sample of 470), therefore, factor analysis (Principal Component Analysis, Varimax rotation) was used to test whether the scale is uni-dimensional. Three factors had Eigenvalues above 1: “importance of preventing consumption of unhealthy foods,” “using food as reward,” and “perceived need to inhibit child’s intake of unhealthy foods.” Two of the original eight restriction items (“I have to be sure that my child does not eat too much of his/her favorite food” and “I intentionally keep some foods out of my child’s reach”) did not fit adequately (factor loadings < .50) to any of the factors and were excluded from further analyses.

**Child questionnaire.** Children’s experienced restriction from the mother was assessed through a Dutch translation (van Strien & Bazelier, 2007) of the Restriction subscale of the Kids’ Child Feeding Questionnaire (Carper, Fisher, & Birch, 2000). The 16 items were read aloud by the researcher and children could respond to these items by choosing between response categories 0 = “no,” 1 = “sometimes,” or 2 = “yes.” Cronbach’s alpha was 0.63.

**Children’s food choices.** To assess children’s food choices, a miniature supermarket, Barbie doll sized was used. The miniature setup contained two cupboards, a freezer, a counter, 86 different food products (30 dinner products, 32 snacks, and 24 drinks), a mother doll, a push-cart, and a girl doll representing the salesclerk. For all children, products were placed in the same position in the store. By no means did the researchers aim to replicate a realistic selection of food products sold in typical Dutch supermarkets. The reason was that this would result in a high number of products and would make the role-play too complicated for young children. However, of note, attention was paid to avoid disproportionate representations of one of the food groups in the miniature grocery shop (a full list of products can be obtained from the authors).

**Procedure**

Data was collected between February and April 2007. Children performed the role-play at their schools, one by one, in a separate room, and during regular school hours. Following the protocol (piloted with five preschoolers) the researcher explained the purpose of the study, then described in general terms what kind of products could be found in the supermarket (e.g., “here you see fruit,” “on the next shelf are vegetables,” “here are drinks,” et cetera). Next, the researcher brought out the mother doll and read, out loud, a story that described the mother discovering, after breakfast, that she had run out of food for the family (father, mother, and children). This mother had to go to the grocery shop to buy dinner products, drinks, and maybe some snacks. The researcher underlined that it was a normal school day and explained that they only needed to buy food for one day. Following this introduction, the children were asked to play the mother and the researcher played the salesclerk. When the children finished shopping, they were asked to put the products on the counter one by one and identify each to ensure the validity of their purchases. If a product was identified incorrectly, it was counted as the product the child referred to. After the role-play, the KCFQ was administered. Finally, the children received a small
token of appreciation. Overall, the children were enthusiastic about the role-play and very motivated to cooperate.

Based on their caloric value in the 2001 Dutch Food Composition Table, the foods were divided within their categories into high or low caloric snacks, drinks, and dinner products. Sum scores in these six categories and a total sum score were computed from the children’s purchases. The average caloric value (Kcal) per 100 grams of each product was 101.8 for low caloric dinner products, 333.5 for high caloric dinner products, 143.7 for low caloric snacks, 445.4 for high caloric snacks, 8.7 for low caloric drinks, and 68.0 for high caloric drinks.

Results

On average, overweight children bought more products in total than nonoverweight children. Overweight children bought significantly more high-caloric dinner products, snacks and drinks than non overweight children and tended to buy both more low-caloric drinks (borderline significant) while no differences were found for low-caloric dinner products and snacks. Most children (82%) bought at least 1 product they did not like themselves. No sex differences in food purchases were found in the total group or in the overweight and nonoverweight groups separately. Not surprisingly, the duration of the role-play (including identification of the purchases) was related with total amount of purchases, \( r(112) = .66, p < .001 \). However, no differences were found between overweight and normal-weight children on duration: on average \( M = 27.91, SD = 8.15 \) and \( M = 25.54, SD = 6.79 \) minutes, respectively, \( r(112) = -1.67, p > .05 \).

Both child and maternal-reported restriction did not significantly differ between overweight and nonoverweight children. In separate linear regressions, children’s and mothers’ reports of maternal restriction were also unrelated to food choices. No significant interactions between weight status and child or mother reported maternal restriction on any of the food choice outcome variables were found (Table 1). When analyses reported above were repeated with the 3 factors the factor “use of food as a reward” \( (r = -.37, p < .01) \) was associated with more low-caloric snacks, whereas high “need to inhibit” \( (r = .38, p < .01) \) was associated with more high-caloric dinner products. Interactions were not significant at \( p < .01 \).

Discussion

Overweight children bought more products in general, particularly more high-caloric foods. This result is in line with positive associations between weight status and the caloric values of what families tend to buy and eat (Krahnstoever-Davison et al., 2005; Ransley et al., 2003). At very young ages, children already mirror their parents’ food choices (Sutherland et al., 2008), therefore children’s food choices in the current study probably reflect what they normally eat, or what they think is appropriate to buy. Food choices might also reflect factors such as preferences, desires, impulsivity, and external eating tendencies. Being overweight relates to overeating in children (Dubois, Farmer, Girard, Peterson, & Tatone-Tokuda, 2007) thus overweight children may have bought more food because they like to eat more and enjoy high-caloric foods. Even though we cannot differentiate between what these children find “normal,” acceptable, and desirable, it seems that the role-play in a miniature supermarket is a suitable tool to study preschoolers’ ideas a normal everyday life food pattern. An important reason behind this assumption is that children were asked to be “the mother” and this was not only verbally expressed during the role-play instructions but was also confirmed in the purchase of products the children disliked themselves. In future research reliability and validity of the role play setting should be determined, a comparison between children’s choices with, for example grocery shopping receipts or asking parents what they usually buy, may provide additional validity for this paradigm. Of note, this setting is not an exact reflection of reality. Taking the children’s age in consideration, we deliberately offered a relatively small range of products compared to real life and we did not provide different portions of the food products. Children were able; however, to buy any product they wanted by identifying a similar wrapping as the product they wanted to buy. In contrast to the clear differences in food purchases between overweight and nonoverweight children, no differences were found in both mother-reported and child-reported maternal restrictions. Additionally, the findings provided no evidence for main or moderating effects of maternal restrictions. Perhaps preschoolers are too young to understand or care about the underlying concept of the parenting strategy, so they copy what their parents feed

### Table 1

**Children’s Purchases: Means, Standard Deviations, and Results for the T-Test Analyses for Independent Samples \( n = 112 \)**

<table>
<thead>
<tr>
<th>Caloric value</th>
<th>Product</th>
<th>Nonoverweight</th>
<th></th>
<th></th>
<th>Overweight</th>
<th></th>
<th></th>
<th>Difference test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>( M )</td>
<td>( SD )</td>
<td>( M )</td>
<td>( SD )</td>
<td>( t )</td>
<td>( p )</td>
<td></td>
</tr>
<tr>
<td>Low cal</td>
<td>Dinner</td>
<td>2.56</td>
<td>2.43</td>
<td>3.14</td>
<td>2.73</td>
<td>1.18</td>
<td>.24</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Snacks</td>
<td>1.27</td>
<td>1.52</td>
<td>1.27</td>
<td>1.50</td>
<td>0.02</td>
<td>.97</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drinks</td>
<td>.95</td>
<td>0.88</td>
<td>1.39</td>
<td>1.41</td>
<td>2.01</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>High cal</td>
<td>Dinner</td>
<td>1.32</td>
<td>1.10</td>
<td>1.91</td>
<td>1.53</td>
<td>2.34</td>
<td>.02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Snacks</td>
<td>3.05</td>
<td>3.34</td>
<td>4.50</td>
<td>3.75</td>
<td>2.16</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drinks</td>
<td>2.78</td>
<td>2.13</td>
<td>4.05</td>
<td>3.47</td>
<td>2.33</td>
<td>.02</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>12.07</td>
<td>7.69</td>
<td>16.35</td>
<td>10.32</td>
<td>2.45</td>
<td>.02</td>
<td></td>
</tr>
</tbody>
</table>
them regardless of the parenting motives behind these decisions.

These results should be considered with some caution since the psychometric properties of the original English version of the CFQ have been reported (Birch et al., 2001; Kaur et al., 2006) and both meaning of the items and association with related constructs might differ for Dutch mothers. In our sample of 470 mothers, the scale had a low alpha and was not unidimensional; however, we have no data to prove the reliability of the alternative three 2-item factor solution. Studies on the psychometric validity of the child CFQ are lacking. With the current data, correlations with mother reported restriction were low (between —.03 and .23) and nonsignificant, which raises some concern. The generalizability of the results is restricted to intact families and the restriction of mothers only, not fathers, in addition, mothers were relatively low educated.

In conclusion, overweight preschool children choose more high-caloric foods than their non-overweight peers, suggesting a positive relation between children’s weight status and the caloric value of what they consider a good food parcel. Maternal restriction did not differ between overweight and normal weight children and was not related to these food choices.

References


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