

Relationship of Mothers' Food Preferences and Attitudes with Children's Preferences

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ABSTRACT

Because early childhood is the most important time for establishing eating habits, controlling the likes and dislikes of children is significant. This study investigated the relationship between mothers' food preferences as well as their attitudes toward food and their children's preferences. A questionnaire was answered by 244 mothers of children aged 3 - 5 years who attended a private kindergarten in Japan. The mothers were asked questions relating to their own current food preferences and those during their childhoods, their eating and cooking habits, and the likes and dislikes of their children. Multiple logistic regression analysis was used to assess the relative importance of mothers' preferences and habits for their children's likes and dislikes. The children's preferences were significantly related to their mothers' likes and dislikes during childhood, rather than to their current preferences, and to the children's breakfast times during holidays and the frequency with which the mothers used takeout meals. This suggests that mothers' likes and dislikes during childhood and their food habits affect their children's preferences. Therefore, to improve children's food preferences, mothers may need to improve their food habits and consider their own food preferences during childhood.

Keywords: Food Preferences; Children; Mothers; Nutrition Education

1. Introduction

Physical and mental development during early childhood is remarkable. "Likes and dislikes" are formed as part of the developing sense of self and taste [1]. Early childhood is the most important time for establishing eating habits, and various studies have been performed on the development of taste in children. Yamamoto [2] pointed out that children's tastes are acquired through their experience and learning, although tastes are also endowed by nature. As well, Ogawa *et al.* [3] described how taste judgments are not inherent in children, but are learned over time through meals that are intended to broaden their tastes. Moreover, Ando [4] described how children's palates develop similarly to their speech, *i.e.*, the more variety of food eaten during childhood, the broader the child's tastes become.

In early childhood, guardians play an important role in preventing children from developing food dislikes by serving a variety of meals 2 or 3 times in a day. According to Ando [4], if guardians always serve meals that exclude certain foods that they do not like, the children may develop a dislike for that food. Some researchers have shown relationships between guardians' current

food preferences and the likes and dislikes of their children [5,6]. Consequently, we hypothesized that mothers' current food preferences affect their children's likes and dislikes. In support of this hypothesis, Pliner and Pelchat [7] reported that children resemble other family members in their food preferences. However, this observation could be explained by children inheriting their parents' preferences. Parents' preferences during their childhoods could have genetic effects on their children [8]. For example, Cook *et al.* [9] reported that preferences and neophobia are highly heritable. Therefore, children's likes and dislikes could be genetic and/or acquired from their mothers. In this study, to test and compare these hypotheses, we investigated the relationships of mothers' current food preferences and/or during their childhoods to their children's preferences.

Eating breakfast with their families, including guardians, has been reported to have a good effect on children's eating habits including good feeling about eating and daily habit to wash hands before meals [10]. Furthermore, the knowledge and attitudes of guardians affect their children's dietary intake [11]. The serving of vegetables by guardians has been reported to affect the vegetable

consumption of family members [12], suggesting that guardians who serve meals that exclude certain foods may affect their children's preferences of guardians to serve meals. Therefore, we hypothesized that guardians' attitudes toward food influence their children's likes and dislikes. To test this hypothesis, we also investigated the influence of mothers' attitudes on children's preferences.

2. Methods

In April 2008, a questionnaire was given to all the mothers of the 244 children aged 3 - 5 years who attended a private kindergarten in Hyogo Prefecture, Japan. There was a questionnaire sheet for each child; so a mother with two children received two sheets and answered for each child. Mothers were well-informed as to the objects and methods of this investigation and answered the questionnaire only if they so desired, without any compelling force and with the right of free withdrawal. Individual privacy was strictly protected through the investigation. This study was approved by the president of the kindergarten. Under these conditions, mothers agreed with their corporation for the scientific investigations in the kindergarten, including this study, when their children entered.

In total, 244 (100%) questionnaires were returned, and all of them were answered, with the exception of some columns left blank in six questionnaires. The blank was treated as "not available answer" for each question. The responders included mothers of 44 3-year-old, 110 4-year-old and 90 5-year-old children, that is, mothers of 112 boys and 132 girls.

The questionnaire for the mothers included 14 question items in the following three parts: 1) their child's food preferences (CC); 2) their food preferences at present (MP) and during their childhoods (MC); 3) their own and their children's lifestyle and food attitude. Mothers answered whether they and their children had dislike foods at present and whether they had had it during their childhoods, and if "yes" to each question above, they also answered which food groups and specific foods they and their children disliked with free description. In addition, questions also included the mothers' cooking habits and their food attitude, as well as their child's life style and food habits.

The program SPSS version 16.0 J was used for statistical analyses. Pearson's Fisher's exact probability test was used to assess the pair-wise relationships among MP, MC, and CC and between CC and children's/mothers' lifestyles and food habits. Multiple logistic regression analysis was performed for association of CC with MP and MC as well as children's/mothers' lifestyles and food habits, following that answers were binarized in the way as to make the numbers of reply for both groups as

similar as possible, e.g., combining five choices: "before 6 a.m.," "6 - 7 a.m.," "7 - 8 a.m.," "8 - 9 a.m.," and "9 - 10 a.m." into two: "before 8 a.m." and "8 - 10 a.m." on the basis of the median.

3. Results

3.1. Children's Preferences and Their Relation-Ships to Various Factors

Among the children, 85.2% had some food dislikes, and 79.1%, 87.3% and 85.6% had food dislikes among the 3-, 4-, and 5-year-old children, respectively. There were no significant differences by age.

Fisher's exact probability test revealed that the relationship of likes and dislikes between MP and CC was not statistically significant (**Table 1(A)**), but the relationship between MC and CC was significant ($p < 0.05$, **Table 1(B)**). CC did not show any significant relationships with any combination of the answers for MP and MC, *i.e.*, either yes or no for MP with either yes or no for MC (**Table 1(C)**). There was a strong relationship between MP and MC ($p < 0.001$, **Table 1(D)**).

Regarding lifestyle and food habits, CC was significantly related to 1) children's bedtime on holidays, 2) breakfast time on holidays; 3) how long a mother takes to prepare breakfast on weekdays, and 4) how often a mother uses takeout meals ($p < 0.01$ for 1) and $p < 0.05$ for 2), 3), and 4), by Fisher's exact probability test).

3.2. Multiple Logistic Regression Analysis

Multiple logistic regression analysis showed that CC was significantly related to MC, rather than to MP, as well as to children's breakfast times on holidays and frequency of the mother's usage of takeout meals (**Table 2**).

3.3. Relationships of Preferences of Food Groups and Specific Foods between Children and Mothers

Table 3 shows the top five food groups and specific foods that mothers selected as disliked by their children and by themselves during their childhoods and at present. In all categories, vegetables were the most disliked food group. Fish and mushrooms were also among the top five in all categories, although the rankings differed.

The relationships of the top three dislikes in each food group and specific foods among children (CC) and their mothers during their childhoods (MC) and at present (MP) are shown in **Table 4**. There were significant relationships both between CC and MC and between CC and MP in disliking vegetables. However, for the other food groups and specific foods, some showed a significant relationship only between CC and MC, some showed a significant relationship only between CC and MP, and

Table 1. Relationships of likes/dislikes among mothers at present (MP) and during childhood (MC) and their children (CC).

	Mother		Children (CC)		Fisher's exact probability test
	At present (MP)	During children (MC)	Yes	No	
A	Yes	-	99 (40.7)	11 (4.5)	P = N.S
	No	-	108 (44.4)	25 (10.2)	
B	-	Yes	96 (39.5)	10 (4.1)	P < 0.05
	-	No	111 (45.7)	26 (10.7)	
C	Yes	Yes	84 (34.6)	8 (3.3)	} P = N.S } } P = N.S } } P = N.S }
	Yes	No	15 (6.2)	3 (1.2)	
	No	Yes	12 (4.9)	2 (0.8)	
	No	No	96 (39.5)	23 (9.5)	} P = N.S }
D	MC	Yes	92 (38.2)	14 (5.8)	P < 0.001
		No	18 (7.5)	117 (48.5)	

Numbers are the actual numbers of the answers. Numbers in parenthesis () mean % in each table 2 × 2 or 4 × 2. N.S, not significant.

Table 2. Multiple logistic regression analysis of factors affecting children's likes/dislikes.

	OR	(95%CI)	P
MC (Mother's likes/dislikes in childhood)	2.64	(1.05, 6.60)	0.038
Children breakfast time in holiday	2.89	(1.26, 6.64)	0.012
Frequency of mothers' usage of takeout meals	3.25	(1.28, 8.25)	0.013

OR, Odds ratio; CI, confidence interval; MC went up if many mothers have disliked food.

Table 3. Top five food groups (a) and specific foods (b) disliked by children and by mothers during childhood and at present. (a) Food group; (b) Specific food.

(a)								
children	Mothers							
	During Childhood				At present			
	N	%	N	%	N	%		
Vegetables	173	57.9	Vegetables	100	43.7	Vegetables	62	31.1
Fishes	49	10.1	Beans	27	11.8	Fishes	37	18.3
Mushrooms	30	6.2	Meats	25	10.9	Beans	28	13.9
Fruits	27	5.6	Mushrooms	23	10	Meats	28	13.9
Eggs	22	4.5	Fishes	19	8.3	Mushrooms	10	5.0

(b)								
Children	Mothers							
	During childhood				At present			
	N	%	N	%	N	%		
Green pepper	62	21.9	Green pepper	27	11.8	Fragmented	16	7.9
Tomato	38	13.4	Mushrooms	22	9.6	Soy beans	16	7.9
Eggplant	26	9.1	Fragmented	15	6.6	Cow's liver	15	7.4
Onion	18	6.3	Soy beans	15	6.6	Fish	13	6.4
Spinach	13	4.6	Carrots	14	6.1	Green pepper	8	4.0

Table 4. Relationships in food groups and specific foods among children and their mothers at present and during their childhoods.

Mothers	Mothers at present and children					Mothers during childhood and children				
	Dislike		Not dislike		P value	Dislike		Not dislike		P value
	Dislike	Not dislike	Dislike	Not dislike		Dislike	Not dislike	Dislike	Not dislike	
Children										
Vegetables	41 (89.1)	5 (10.9)	132 (66.7)	66 (33.3)	0.002	58 (82.9)	12 (17.1)	115 (66.1)	59 (33.9)	0.012
Fishes	4 (14.3)	24 (85.7)	28 (13.0)	188 (87)	0.771	2 (13.3)	13 (86.7)	30 (13.1)	199 (86.9)	1.000
Mushrooms	1 (10)	9 (90)	30 (12.8)	204 (87.2)	1.000	3 (13)	20 (87)	28 (12.7)	193 (87.3)	1.000
Green pepper	4 (50)	4 (50)	58 (24.6)	178 (75.4)	0.116	14 (51.9)	13 (48.1)	48 (22.1)	169 (77.9)	0.002
Tomato	3 (60)	2 (40)	35 (14.6)	204 (85.4)	0.028	3 (33.3)	6 (66.7)	35 (14.9)	200 (85.1)	0.150
Eggplant	2 (50)	2 (50)	24 (10)	216 (90)	0.057	4 (57.1)	3 (42.9)	22 (9.3)	215 (90.7)	0.003

Values are the number of responses. P values are from Fisher's exact probability test; Numbers in parenthesis () mean % of "dislike" or "not dislike" in both.

others indicated no relationship between CC and MC or between CC and MP.

3.4. Mothers' Use of Food Disliked by Themselves or Their Children

Regarding the frequency with which mothers prepared meals using the food their children disliked, 3.7% answered "often", 30.3% answered "sometimes", 35.8% answered "rarely" and 30.3% answered "never". Regarding preparing meals using food that the mothers themselves did not like, 12.6% answered "often", 62.1% "sometimes", 19.7% "rarely", and 5.6% answered "never". Fisher's exact probability test revealed there was a significant difference between them ($p < 0.001$). Mothers were more likely to "often" or "sometimes" prepare meals using their children's dislike food compared with using their own dislike food.

4. Discussion

Likes and dislikes play an important role in food choices. Children may genetically inherit their mothers' preferences and/or learn it in their childhood life. Thus, mothers' preferences in childhood and/or at present were hypothesized to affect their children's preferences. The present study using Fisher's exact probability test showed that MC had a significant relationship with CC (**Table 1**). In this study, we also used multiple logistic regression

analysis to assess the relative importance of MC and MP on CC, as well as children's/mothers' lifestyles and food habits (**Table 2**). The multiple logistic regressions showed that CC was significantly related to MC, rather than MP. Taken together, our results suggest that genetic factors influence children's food preferences more than acquired factors. The finding corresponds with the previous data about genetic influences on food preferences reported by Falciglia and Norton [8] and by Cook *et al.* [9]. Although, to confirm that, genetic analyses and the similar questionnaire surveys at many other kindergartens were necessary, it can be said that the information about their mothers' preferences in childhood may be useful, when we consider children's preferences.

Some investigators have insisted that preferences are shaped by a combination of genetic and environmental factors [13]. Kronl *et al.* reported that environment and learning appeared to exert a stronger influence than genetics on food-related behavior [14]. In this study, we also investigated the relationship of some mothers' lifestyle and food habits to CC. CC was significantly related to 1) children's bedtimes during holidays ($p < 0.01$); 2) breakfast times during holidays ($p < 0.05$); 3) how long a mother takes to prepare breakfast during weekdays ($p < 0.05$); and 4) how often a mother uses takeout meals ($p < 0.05$). According to multiple logistic regression analyses for association of CC with mothers' lifestyle and food habits as well as MP and MC, CC was significantly re-

lated to children's breakfast time during holidays and to the frequency with which mothers used takeout meals, as well as to MC (**Table 2**). These results suggest that some of mothers' and children's food habits are related to CC. It is supported by several findings concerning significant influences of parental attitudes on the development of children's eating behaviors [11,15,16]. In addition, Moriwaki *et al.* [17] found that if the primary household cook was health conscious and had a positive attitude toward food education, children in the household had no problems with food habits.

The present study also ranks the food groups and specific food dislikes of children (CC) and of mothers during childhood (MC) and at present (MP) (**Table 3**). The results show that vegetables were the most commonly disliked food in all three groups. There was a great variety among all three groups in the other disliked food groups and specific foods. Among the children's top three disliked foods, only vegetables showed significant relationships both between CC and MC and between CC and MP (**Table 4**). The other food groups and specific foods showed different relationships in likes and dislikes between CC and MC/MP. The relationships were quite different from the relationship of likes and dislikes in general between CC and MC/MP. When mothers were asked whether they and their children had likes and dislikes in general, their answers indicated that CC was significantly related to MC, rather than MP as shown above (**Tables 1 and 2**). However, this does not necessarily mean there was no relationship of MP with CC in general. This study has shown that for some types of foods, there may be a significant relationship in likes and dislikes between MP and CC. Therefore, further studies are needed to investigate the relationship in detail not only of MC with CC for each food group and specific food, but also of MP with CC for them and in general.

Our study showed that few mothers prepared meals with their disliked food, while many mothers prepared meals with their children's disliked food. This may be why the mothers' current dislike for some types of foods was related to their children's dislike of the foods. Thus, mothers' attitudes of serving foods may influence children's attitude concerning likes and dislikes. Wenrich *et al.* reported that family members' vegetable selection was affected by guardians' vegetable serving [12]. As well, Mineki *et al.* showed that in families where guardians often prepared meals with fish, children tended to like fish [18]. Therefore, we believe, in order to improve children's food likes and dislikes, it is important to give children a variety of food, regardless of the mothers' current likes and dislikes.

In conclusion, this study suggested that mothers' likes and dislikes during childhood and their food habits affect their children's preferences. Mothers may need to im-

prove their food habits and consider their own food preferences during childhood in order to improve children's food preferences.

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