

Parents' food choice motives and their associations with children's food preferences

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Abstract

Objective: The objective was to investigate parents' motives for selecting foods for their children and the associations between these motives and children's food preferences.

Design: Cross-sectional survey. A modified version of the Food Choice Questionnaire was used to assess parents' food choice motives. Parents also reported children's liking/disliking of 176 food and beverage items on 5-point Likert scales. Patterns of food choice motives were examined with exploratory principal component analysis. Associations between motives and children's food preferences were assessed with linear regression while one-way and two-way ANOVA were used to test for sociodemographic differences.

Setting: Two Australian cities.

Subjects: Parents (n 371) of 2–5-year-old children.

Results: Health, nutrition and taste were key motivators for parents, whereas price, political concerns and advertising were among the motives considered least important. The more parents' food choice for their children was driven by what their children wanted, the less children liked vegetables ($\beta = -0.27$, $P < 0.01$), fruit ($\beta = -0.19$, $P < 0.01$) and cereals ($\beta = -0.28$, $P < 0.01$) and the higher the number of untried foods ($r = 0.17$, $P < 0.01$). The reverse was found for parents' focus on natural/ethical motives (vegetables $\beta = 0.17$, $P < 0.01$; fruit $\beta = 0.17$, $P < 0.01$; cereals $\beta = 0.14$, $P = 0.01$). Health and nutrition motives bordered on statistical significance as predictors of children's fruit and vegetable preferences.

Conclusions: Although parents appear well intentioned in their motives for selecting children's foods, there are gaps to be addressed in the nature of such motives (e.g. selecting foods in line with the child's desires) or the translation of health motives into healthy food choices.

Keywords
Food choice
Food preferences
Children
Parents

Despite the well-documented health benefits, large numbers of children in Australia^(1,2) and elsewhere^(3,4) consume diets inconsistent with the recommendations of health organisations. Of particular concern are discrepancies between recommended intakes and children's actual intakes of fruits and vegetables, water, sugar-sweetened beverages, food variety and non-core (i.e. energy-dense, nutritionally poor) foods⁽⁵⁾. In order to shift children's food intakes closer to dietary recommendations, a good understanding of the factors affecting children's food intakes is needed⁽⁶⁾.

While there is a range of individual and environmental influences on children's food intakes, food preferences have consistently been shown to be particularly influential. Existing patterns of food preferences tend to impede the consumption of a healthy diet by hindering the consumption

of healthy foods and promoting the consumption of non-core foods, especially in children^(7–10). That is, children prefer foods that are recommended to be consumed infrequently or in small amounts (non-core foods) while the most disliked foods include those that promote good health, notably vegetables^(11–14). Children are thought to be in a sensitive period for learning about food between the ages of 2 and 5 years, when they are particularly receptive to learning about food acceptability⁽¹⁵⁾. During this period children appear to develop dislikes for many foods, especially vegetables⁽¹²⁾. These developed likes may translate into food patterns that influence food choice during childhood and adulthood^(12,16–18). For this reason, identification of factors that influence children's food preferences within this age group will help in the effective design of interventions to improve children's food preferences and dietary intakes.

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Children develop their food preferences largely through repeated exposure to foods^(17,19–23). Parents are arguably the most important environmental variable affecting the development of children's food preferences due to their role in determining which foods children are exposed to⁽²⁴⁾. Indeed parents, and the wider community, see parents, especially mothers, as influential and responsible for children's food preferences and dietary intakes^(12,25,26). Intervention studies aimed at modifying children's food preferences, weight status and dietary intake support these lay views of the importance of parents: those interventions in which parents were involved tended to have more positive effects on dietary behaviour change than interventions that did not incorporate parents⁽²⁷⁾. Furthermore, parents are the primary agents of socialisation for children of pre-school age⁽²⁸⁾. Despite the significant role of parent-led exposure in determining children's food preferences⁽²²⁾ we presently lack a good understanding of the reasons why parents make certain foods available to their children. Knowing upon what basis parents make decisions about exposing their children to foods is a necessary prerequisite to addressing parental food choices and therefore children's exposure to foods. Adults in general consider a broad range of factors including taste, price, health and convenience^(6,29–31) when making food choices. However there may be particular patterns of food choice motives unique to parents. Two recent studies from Scandinavia add to our understanding of parental food choice motives in those countries^(32,33). It may be expected, though, that differences will exist between parental food choice motives across countries and sociodemographic groups^(29,31) and research in different population groups is needed.

In the present study we aimed to examine parental food choice motives in a group of Australian mothers of 2–5-year-old children with the view to extending previous work reporting associations between parents' food choice motives and children's food intakes^(32,33) by examining whether parents' food choice motives were related to children's food preferences. Furthermore, the effects that different eating occasions have on parents' food choice motives has not previously been examined extensively, despite evidence that children eat different foods at different eating occasions such as snacks and evening meals^(34,35). We addressed this gap by examining parental food choice motives for children's snacks and evening meals.

The focus in the present study was therefore on describing a broad range of factors that may affect parents' reasons for selecting their pre-school children's foods in two eating contexts (evening meal and snack) and on examining relationships between the motives and children's food preferences. Information on parents' food choice motives in different samples and their associations with children's food preferences may help to inform recommendations and strategies targeted at parents aimed at shifting children's food preferences and intakes closer to health recommendations.

Method

Study design

The data reported here formed part of a larger investigation of parental influence on children's food preferences, and the methodology has been reported in detail elsewhere⁽¹¹⁾. In brief, a convenience sample of parents was recruited from various sporting and child-care centres in two medium-sized Australian cities (Melbourne, 44.20% and Adelaide, 55.80%). In order to recruit parents and children from a variety of socio-economic levels, centres were selected from three socio-economic groups in each city by selecting suburbs in the bottom, middle and top quintile of the Socio-Economic Index for Areas (SEIFA) Index of Relative Socio-Economic Advantage/Disadvantage (a composite measure of the incomes and the skill level of the workforce)⁽³⁶⁾. Parents of children aged between 2 and 5 years were targeted in these centres and given a self-completion questionnaire, an information letter and a consent form. A copy of the questionnaire is available from the authors.

The study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects/patients were approved by the Deakin University Human Research Ethics Committee (EC 84–2004). Written informed consent was obtained from all participants.

Instrument

The questionnaire covered the child's liking of 176 foods and drinks chosen to cover the range of foods consumed in Australia (measured on a 5-point Likert scale, anchors of 'dislike extremely'–'like extremely' with the additional options of 'never tried' and 'do not know'), socio-demographic indicators (parent's education level, post-code and child's sex) and parents' food selection criteria. Parents' food selection criteria were derived from the Food Choice Questionnaire (FCQ)⁽⁶⁾. In its original form, the thirty-six items in the FCQ are clustered into the nine factors of Health, Mood, Convenience, Sensory Appeal, Natural Content, Price, Weight Control, Familiarity and Ethical Concern. The FCQ has been used extensively across a number of different population groups (e.g. references 29–32). In the present context the wording of some items was modified so that it was couched in terms of the child. For instance, 'is what I usually eat' was changed to 'is what s/he usually eats'. The item 'is like the food I ate when I was a child' was removed as it was irrelevant to this sample. Six items based on a study of parents' reasons for serving foods were added: 'is what other family members like', 'is good quality or fresh', 'is what I like', 'is what she/he likes' and 'provides food variety'⁽³⁷⁾. The items 'is part of his/her habit or routine' and 'is advertised on TV' were also included based on literature suggesting they may be important influences on parents' food selections^(38,39). Respondents were asked to

respond to the question 'It is important to me that the food I choose for my child for a typical snack or evening meal...' and rate each of the forty-four food choice items on a 4-point scale ('not at all important'/'a little important'/'moderately important'/'very important').

Data analyses

All statistical analyses were carried out using the statistical software package SPSS for Windows release 12.0 (2004) and, to reduce the likelihood of Type 1 error, an α level of $P < 0.01$ was selected for statistical significance testing. Descriptive statistics (means and standard deviations) were extracted to determine the relative importance of the individual motive items. Food choice motives were then examined with exploratory factor analysis (principal components with varimax rotation) as the factor structure of the FCQ varies across different populations⁽²⁹⁾. An item was considered to load on a given factor if the absolute factor loading was ≥ 0.40 on that factor and < 0.40 on all other factors⁽⁴⁰⁾. Pair-wise deletion of variables was employed. Differences in parents' food choice motivations by socio-economic status (SES) and parental education level were examined with one-way and two-way ANOVA.

Relationships between parents' food selection criteria (factors) and children's food preferences were examined via linear regression analyses. Measures of food preferences were: (i) mean liking for the foods within each *Australian Guide to Healthy Eating* food group (including Extra Foods, which are non-core, low-nutrient, high-energy foods to be eaten in moderation); and (ii) a Healthy Preference Index (HPI)⁽¹¹⁾. The HPI was constructed by summing scores constructed to reflect each of the ten *Australian Guide to Healthy Eating* recommendations (e.g. eat plenty of vegetables and legumes, enjoy a wide variety of nutritious foods) to provide an overall indicator of how well children's food preferences aligned with dietary recommendations. A description of the construction of the HPI can be found in Russell and Worsley⁽¹¹⁾. The κ statistic⁽⁴¹⁾ was used to examine similarity between motives for the snack and evening meal contexts and Pearson correlations tested associations between parents' motives and the number of untried foods.

Results

Demographic characteristics of the sample

Demographic characteristics of the sample ($n = 371$) are described in Table 1. Briefly, most respondents were mothers or female carers, over 90% of whom were married or in *de facto* relationships. Over half of the parents were university graduates and there was broad representation of the five SES strata. Most parents were in full- or part-time employment. Over two-thirds of the children were 4 and 5 years of age and the sexes were evenly balanced. Broadly, the parental sample was representative of the

Table 1 Demographic characteristics of the sample of parents ($n = 371$) of 2–5-year-old children, Melbourne and Adelaide, Australia

	<i>n</i> *	%
Respondent		
Mother/female carer	335	91
Father/male carer	36	10
Socio-economic status		
5 (highest advantage)	98	26
4	70	19
3	92	25
2	44	12
1 (lowest advantage)	65	18
Age of child		
2 years	31	8
3 years	96	26
4 years	169	46
5 years	75	20
Education of parent		
Completed university or tertiary education	205	56
High school/technical or trade certificate	123	33
Did not complete high school	39	11
Sex of child		
Male	191	54
Female	164	46
Parent's marital status		
Married	312	85
<i>De facto</i> /living together	28	8
Separated	9	2
Divorced	7	2
Never married	11	3
Parent's employment status		
Home duties, full time	132	36
Unemployed	3	1
Student	9	2
Retired	1	0
Employed, part time	151	41
Employed, full time	58	16
Other	14	4

*Cells may not add up to 100% due to missing data or rounding.

Australian adult population although the sample was better educated⁽⁴²⁾.

Description of parents' motives for the selection of their children's snack foods

The κ statistics indicated significant ($P < 0.001$) agreement between each of the forty-four items on parents' food selection criteria for their child's snack and for the evening meal; hence for brevity only the snack food items are presented here.

As shown in Table 2, taste and nutrition were important motivators for parents when selecting their children's foods. Over 90% of the sample thought it was 'moderately' or 'very' important that their child's snack food 'keeps him/her healthy', 'is nutritious' and 'is good quality or fresh'. It was also highly important to parents that the food they select for their children 'tastes good' (<90% rated as 'very' or 'moderately' important). A large percentage of parents (85.10%) indicated that the motive 'is what s/he likes' was also very or moderately important to them while 'is what I like' or 'what other family members like' were less important motives. The motive 'is what s/he asks

Table 2 Summary statistics from the exploratory principal components analysis of parents' snack food choice motive items; sample of parents (*n* 371) of 2–5-year-old children, Melbourne and Adelaide, Australia

Motive factors and items	Factor loading (≥0.40)	<i>n</i>	% rating item as 'moderately' or 'very' important
'It is important to me that the food I choose for my child for a typical snack...'			
Health and Nutrition			
Is good for her/his skin, teeth, hair, nails, etc.	0.77	386	86.5
Keeps her/him healthy	0.76	385	86.5
Contains a lot of vitamins and minerals	0.74	386	88.7
Contains natural ingredients	0.66	386	84.1
Provides food variety	0.65	386	90.0
Is nutritious	0.61	387	93.8
Is high in fibre and roughage	0.48	388	75.8
Is high in protein	0.48	383	77.3
Contains no additives	0.44	387	63.6
Is good quality or fresh	0.44	384	93.0
Contains no artificial ingredients	0.43	385	69.8
Mood			
Helps her/him cope with life	0.77	380	48.5
Helps her/him cope with stress	0.74	370	33.2
Helps her/him relax	0.73	377	47.7
Makes her/him feel good	0.68	384	60.1
Cheers her/him up	0.63	386	43.6
Keeps her/him awake or alert	0.62	383	42.1
Child's Wants			
Is familiar to my child	0.77	386	59.1
Is what s/he usually eats	0.73	386	60.2
Is what s/he asks me for	0.59	387	46.9
Is part of her/his habit or routine	0.57	384	58.2
Is advertised on TV	0.45	387	4.1
Is what s/he likes	0.41	387	85.1
Natural/Ethical			
Contains no additives	0.47	387	63.6
Contains no artificial ingredients	0.41	385	69.8
Comes from countries I approve of politically	0.64	387	13.4
Has the country of origin clearly marked	0.66	388	22.9
Is packaged in an environmentally friendly way	0.57	388	44.2
Convenient to Prepare			
Can be cooked very simply	0.77	387	50.9
Is easy to prepare	0.86	386	54.4
Takes little time to prepare	0.79	386	37.2
Sensory Appeal			
Has a pleasant texture	0.50	386	59.3
Looks nice	0.66	387	57.7
Smells nice	0.75	387	65.5
Tastes good	0.47	388	92.2
Weight Control			
Helps my child control her/his weight	0.73	385	54.7
Is low in calories	0.74	387	46.4
Is low in fat	0.79	386	59.3
Price			
Is cheap	0.80	381	18.9
Is not expensive	0.78	387	25.6
Is value for money	0.73	386	54.7
Quality			
Is good quality or fresh	0.62	384	93.0
Contains no artificial ingredients	0.54	385	69.8
Can be home made	0.65	387	83.3
Convenient to Buy			
Can be bought in shops close to where I live or work	0.75	386	64.2
Is easily available in shops and supermarkets	0.70	387	74.7
Others' Preferences			
Is what I like	0.52	383	55.8
Is what other family members like	0.69	384	72.5

me for' was considered to be 'moderately' or 'very' important by approximately half of the sample. The majority (>90%) of parents indicated that the food being advertised on TV was 'not at all' or 'a little important' to

them when selecting foods for their children's snacks. Approximately three-quarters of parents indicated that a food being 'cheap' or 'not expensive' was not or of little importance to them.

Table 3 Descriptive results from the factor analysis of parents' snack food choice motive items; sample of parents (*n* 371) of 2–5-year-old children, Melbourne and Adelaide, Australia

Factor	% of variance explained	α	Mean	SD	<i>n</i>
Health and Nutrition	22.46	0.89	3.17	0.53	345
Mood	8.87	0.84	2.42	0.75	339
Child's Wants	6.06	0.73	2.51	0.49	357
Natural/Ethical	4.33	0.74	2.25	0.62	362
Convenient to Prepare	4.02	0.81	2.64	0.78	362
Sensory Appeal	3.64	0.71	2.80	0.63	365
Weight Control	3.05	0.77	2.50	0.82	361
Price	2.75	0.77	2.16	0.72	357
Quality	2.70	0.68	3.11	0.64	359
Convenient to Buy	2.45	0.64	2.88	0.78	364
Others' Preferences	2.33	0.52	2.43	0.80	359

The structure of parent's motives for selecting their children's snack foods

Eleven components were extracted from the exploratory principal components analysis of parents' motives for selecting foods for their children, explaining 62.65% of the variance and they were interpretable. The Kaiser–Meyer–Olkin Measure of Sampling Adequacy was 0.88 and Bartlett's test of sphericity was significant ($P < 0.01$). The factors and descriptive results from the factor analysis are reported in Table 3. Cronbach's α ranged from 0.89 to 0.52 for the extracted factors. With regard to the importance given by parents to each of the factors when selecting foods for their children's snacks, the eleven extracted factors differed in the mean rating of importance over the individual items comprising the factor. It can be seen in Table 3 that for the largest factor, Health and Nutrition, the mean importance rating in food choice for the individual items was 3.17 (SD 0.53).

The results in Table 2 show that the individual items in this factor were rated by the majority of parents as being 'moderately important' or 'very important' motives when selecting foods for their children's snacks. The other extracted factors had lower mean importance ratings for the individual items and smaller percentages of parents rating the individual items as 'moderately' or 'very' important. For example, the factor Price had a mean of 2.16 (SD 0.72) and it can be seen in Table 2 that two of the three individual items comprising this factor were rated by approximately one-quarter or less as 'moderately important' or 'very important' for the parent when choosing snack foods for the child.

Children's food preferences

The children's liking for each of the food groups is shown in Table 4. Children liked the non-core Extra Foods and Cereals groups the most, and the Vegetables group the least.

Relationships between parents' food choice motives and children's food preferences

In Table 5 the results of the linear regression analyses are documented. The factor Child's Wants was significantly

Table 4 Children's mean liking for each food group from the *Australian Guide to Healthy Eating*, measured on a 5-point Likert scale (1 = 'dislike extremely', 5 = 'like extremely'); sample of parents (*n* 371) of 2–5-year-old children, Melbourne and Adelaide, Australia

Food group	<i>n</i>	Mean	SD
Cereals ^a	371	4.13	0.49
Extra Foods ^{a,b}	371	4.08	0.42
Dairy ^{a,b}	371	4.06	0.64
Meats ^c	370	3.89	0.63
Fruit ^c	371	3.88	0.67
Vegetables	370	3.15	0.71

^{a,b,c}Food groups with unlike superscript letters were significantly different ($P < 0.01$).

associated with lower liking of Vegetables, Fruit and Cereals, while the Health and Nutrition factor was associated with slightly greater liking of Vegetables and Fruit. The Natural/Ethical factor was also associated with greater liking of Vegetables and Fruit, while Convenient to Prepare was associated with greater liking of Cereals.

The factor Child's Wants was also negatively correlated with the number of foods children had not tried ($r = -0.17$, $P < 0.01$). None of the other food choice motive factors were significantly associated with the number of untried foods (r ranged from -0.12 to 0.10 , NS).

Relationships between parents' food choice motives and demographic variables: child's age and sex, socio-economic status and parental education

No statistically significant differences were observed in parents' food choice motives factor scores by the child's age (probabilities ranged from 0.04 to 0.87) and sex (probabilities ranged from 0.04 to 0.97). Differences in parents' food choice motives by SES and parental education level were also not observed (data not reported). The one exception was that parents who had not completed high school scored higher on the factor Child's Wants ($F(2, 291) = 4.92$, $P < 0.01$) than those who had completed university/tertiary education.

Table 5 Results from linear regression analyses showing relationships between parents' food choice motives and measures of children's food preferences; sample of parents (n 371) of 2-5-year-old children, Melbourne and Adelaide, Australia

	HPI		Vegetables		Fruit		Extra Foods		Cereals		Dairy		Meats	
	R^2	P	R^2	P	R^2	P	R^2	P	R^2	P	R^2	P	R^2	P
Health and Nutrition	0.06	0.28	0.11	0.04	0.13	0.02	-0.03	0.67	0.15	0.01	0.03	0.57	0.06	0.29
Mood	-0.06	0.27	-0.04	0.51	-0.05	0.35	0.01	0.89	-0.12	0.03	-0.02	0.69	-0.01	0.83
Child's Wants	-0.16	0.01	-0.27	0.00	-0.19	0.00	-0.05	0.43	-0.28	0.00	-0.09	0.13	-0.13	0.02
Natural/Ethical	0.12	0.03	0.17	0.00	0.17	0.00	-0.03	0.63	0.14	0.01	0.04	0.54	0.12	0.04
Convenient to Prepare	0.11	0.06	0.03	0.61	0.09	0.12	0.17	0.00	0.20	0.00	0.08	0.16	0.13	0.02
Sensory Appeal	0.03	0.61	0.03	0.55	0.01	0.80	0.07	0.22	0.11	0.05	0.09	0.12	0.07	0.22
Weight Control	0.09	0.12	0.04	0.52	0.08	0.16	0.10	0.10	0.02	0.68	0.10	0.10	0.08	0.16
Price	-0.02	0.73	0.04	0.48	-0.02	0.69	0.09	0.11	-0.04	0.47	0.10	0.08	-0.01	0.93
Quality	0.06	0.27	0.03	0.56	0.02	0.77	-0.02	0.77	0.10	0.06	0.06	0.32	0.06	0.33
Convenient to Buy	-0.01	0.84	-0.11	0.05	-0.06	0.28	0.00	0.99	-0.02	0.70	-0.03	0.66	-0.09	0.13
Others' Preferences	0.00	0.94	-0.03	0.55	-0.06	0.28	0.04	0.49	0.07	0.20	-0.03	0.66	0.03	0.63

HPI, Healthy Preference Index. Significant P values are indicated in bold font.

Discussion

When selecting foods for their children, parents were primarily motivated by the child's needs and wants such as health and nutrition and the child's liking of the food's taste. Other factors not directly connected to the child (such as price or ethics) were considered less important. Parents' food choice motives associated with children's food preferences in two main ways. These were: (i) that parents who were more motivated by natural/ethical concerns had children with healthier patterns of food preferences; and (ii) that parents who were motivated by their child's desires had children with unhealthier patterns of food preferences. While associations between parents' health motivations and children's healthier food preferences trended towards statistical significance, many of the other parental food choice motives were not predictive of children's food preferences.

Child-centred motives

The child's needs and desires were of principal concern for parents. Children's liking of a food's taste was among the most important considerations for parents when selecting foods for their children: more than 90% of the sample indicated that it was 'very' or 'moderately' important to them that they selected foods for their children that they already liked. Many parents were also influenced by their child's food requests, with 'is what s/he asks me for' considered 'very' or 'moderately' important by approximately half of the parents in the present study. These results confirm and expand earlier findings noting the influence of children's food preferences and requests for food on parents' food decisions⁽⁴³⁻⁴⁵⁾ by elaborating on the importance of this motive relative to other competing criteria such as health, cost and ethical considerations. Furthermore, we have shown that the Child's Wants factor (selecting foods in line with the child's desires) was not only an important motive for parents, but was also associated in negative ways with children's food preferences (i.e. low liking for fruit, vegetables and cereals and greater numbers of untried foods).

These results may be an indication of the central and possibly negative influence of children upon some parents in the socialisation of children's eating. Child-centredness in feeding may be counterproductive to the development of healthy food preferences, as selecting for children those foods that they already like or are familiar with may hinder exposure to new foods and those foods that may require several tastings to become liked, such as vegetables^(16,23,46). In the present study the Child's Wants motive was linked with children having tried fewer foods, supporting the notion that parents who prioritise this factor offer their children a narrower range of foods. Furthermore, children often have greater preferences for foods higher in salt⁽⁴⁷⁾, sugar⁽⁴⁸⁾, energy density and fat content^(49,50) and so it is expected that their food requests are for these types of

foods⁽⁵¹⁾. This, coupled with evidence showing that allowing children freedom to eat what and when they wish or providing children with many food choices is associated with less healthy patterns of food intake in children^(52,53), suggests that allowing children to influence parental food choices may result in unhealthy patterns of food preferences and intakes. Also of importance was that in the present research greater child-centredness in food selection was linked with lower parental education levels, suggesting that lower-SES parents, who tend to have children at greater risk of unhealthy eating⁽⁵⁴⁾, may be more likely to adopt this feeding approach.

Health and nutrition motives

Although children's desires were important to parents when selecting their children's foods, health and nutrition were rated as the most important motives by parents in this sample. However, the Health and Nutrition factor only trended towards statistical significance in tests of associations with children's food preferences. Although the present cross-sectional research cannot determine directionality of effect, it does suggest that a gap exists between parents' health-related food choice motives and children's food preferences. Notwithstanding the limitation of relying on parents' reports and a possible social desirability bias in reporting health motivations, it is conceivable that being motivated by health and nutrition may not have related to actual provision of more healthy foods to the child⁽⁵⁵⁾. There are several possible reasons for this discrepancy, such as competing demands between the provision of healthy foods and other factors such as time pressures⁽⁴³⁾ or the competing interests of selecting foods in line with the child's desire or requests for other foods. It is also feasible that parents lack the necessary nutrition knowledge to be able to select healthy foods for their children⁽²⁴⁾. However parental health motivations have been linked with children's healthier diets⁽³²⁾. An alternative explanation, then, is that parents who are motivated to choose healthy foods for their children inadvertently present these foods to children in ways that promote disliking (e.g. rewarding children for eating them^(24,56)), which would allow for greater intake but not greater liking of healthy foods. The weak associations between parental health motivations and children's healthier patterns of food preferences do point to a need to better understand the barriers parents face in offering healthy foods to their children and encouraging their children to like such foods.

Natural and ethical motives

Parents' scores on the Natural/Ethical food motive factor were associated with children's healthier food preferences (greater liking of vegetables and fruits). It is unknown why these types of motives may be associated with children's healthier food preferences (instead of health motives). Scores on this factor were not associated with the

sociodemographic variables measured here. We speculate that parents who consider natural and ethical criteria when selecting foods may be characterised by a particular value set (e.g. environmentally concerned) or knowledge base (e.g. on how food products are made or how children develop their food preferences), which may make the appropriate provision of healthy foods to their children more likely. Future investigations of such motives may provide additional understanding of the beliefs and behaviours of this group of parents.

Sociodemographics and cost considerations

We expected that cost considerations in food choice could be important to parents, as they are to the general adult population (e.g. references 6, 31, 37, 57–59). This was not the case, however, with price being rated among the least important motives for parents in the present study. Working mothers are less likely to rate price as an important consideration in selecting foods for the family⁽⁶⁰⁾ and approximately half of our sample was working in either full- or part-time employment. However, price was also one of the least important motives in two Scandinavian studies of parental food choice motives^(32,33) lending weight to the notion that price is less of a consideration than other factors for parents, possibly because of the high priority parents give to children's desires, health and nutrition. We also observed few differences in the food selection motives by parental education level or SES, confirming the findings of others^(32,33). Socio-economic factors can be significant in the quality of children's diets⁽⁵⁴⁾ and therefore differences may also be expected in parental motives. It appears, though, that parents are similarly motivated across sociodemographic groups although their actual food choices may differ. It should also be noted that many of the other measures of parental food choice motives were not associated with children's food preferences either, suggesting more general gaps between parents' motivations and their feeding behaviours. A better understanding of the barriers towards provision of healthy foods to children is needed to better understand how parental motives translate into food purchases and feeding behaviours.

Eating context

We also expected to see differences between the motives of parents when choosing children's snack foods and when choosing foods for the evening meal. However, of the forty-four possible reasons for selecting foods examined here, none was significantly different in importance between the two eating contexts, suggesting that parents use similar criteria for different eating contexts. This is despite likely differences in the location, company and types of foods that may be consumed^(34,54). This result suggests that parents' food choice motives may be more overarching, perhaps being reflective of general beliefs or

values rather than context-specific food selection criteria. Others have also noted that parental attitudes to feeding remain consistent over time and context yet feeding behaviours vary⁽⁵³⁾.

Instrument structure

Finally, it is also worth noting that when used in this parent sample, the factor structure of the modified FCQ differed in some ways from the original one of Steptoe *et al.*⁽⁶⁾. These were: (i) the existence of three additional factors, namely Quality, Others' Preferences and Child's Wants factors; (ii) the Convenience factor appeared as separate Preparation and Purchasing factors in the current study whereas it appeared as one factor in Steptoe *et al.*'s study⁽⁶⁾; and (iii) the Natural and Ethical Concern factors were combined. Roos *et al.* also noted that Ethical Concern was combined with Health in their study of parents' food choice motives for the family⁽³²⁾. Although differences would be expected from the original version of the FCQ due to the modification of the questionnaire for the current study, it is likely that parents may have different patterns of motives from the general adult population as they are feeding children, not only themselves. For example, parents in countries like Australia, who are typically time-poor, may be more affected by convenience in preparation as opposed to consumption (which is to be done by the child), and this distinction is seen here. Similarly, the existence of the factors related to the child's desires and preferences of others may reflect the parental concern for the competing needs of children and other family members. Our results suggest that future studies of parental food choice motives may benefit from using a modified version of the FCQ to capture the motives unique to parents.

Limitations

The current study is limited by several factors inherent to cross-sectional self-report surveys. First, the design does not permit determination of directionality in the relationships observed. Further, parents reported on both their motives and children's food preferences, thus increasing the likelihood that results are affected by reporting bias. Additionally, the study was conducted on a convenience sample of parents in two Australian cities and further studies of larger, representative samples across different regions and demographic groups are warranted.

Conclusions

Children's desires (e.g. food likes) and needs (e.g. health) were among the top motives for parents when selecting foods for their children to consume. However, although parents reported being highly motivated by health and nutrition, such motives did not translate convincingly into

children's healthier food preferences. Importantly, parents who reported being influenced by their children's desires such as their current food preferences and food requests had children with less healthy food preferences. The latter association suggests that children's food preferences and requests appear to be not only an important determinant of their own food choices, but also those of their parents. Interventions targeted at parents should consider educating parents about strategies for translating their health motivations into healthy food choices and feeding practices for managing their children's extant preferences and requests for foods.

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References

1. Magarey AM, Daniels L & Smith A (2001) Fruit and vegetable intakes of Australians aged 2–18 years: an evaluation of the 1995 National Nutrition Survey data. *Aust N Z J Public Health* **25**, 155–162.
2. Australian Institute of Family Studies (2005) *Growing Up in Australia: The Longitudinal Study of Australian Children: 2004 Annual Report*. Melbourne: Australian Institute of Family Studies, Commonwealth of Australia.
3. Fox MK, Pac S, Devaney B *et al.* (2004) Feeding infants and toddlers study: what foods are infants and toddlers eating? *J Am Diet Assoc* **104**, 1 Suppl. 1, S22–S30.
4. Muñoz KA, Krebs-Smith SM, Ballard-Barbash R *et al.* (1997) Food intakes of US children and adolescents compared with recommendations. *Pediatrics* **100**, 323–329.
5. Rangan AM, Randall D, Hector DJ *et al.* (2007) Consumption of 'extra' foods by Australian children: types, quantities and contribution to energy and nutrient intakes. *Eur J Clin Nutr* **62**, 356–364.
6. Steptoe A, Pollard TM & Wardle J (1995) Development of a measure of the motives underlying the selection of food: the food choice questionnaire. *Appetite* **25**, 267–284.
7. Birch LL, McPhee LS, Bryant JL *et al.* (1993) Children's lunch intake: effects of midmorning snacks varying in energy density and fat content. *Appetite* **20**, 83–94.
8. Domel SB, Thompson WO, Davis HC *et al.* (1996) Psychosocial predictors of fruit and vegetable consumption among elementary school children. *Health Educ Res* **11**, 299–308.
9. Resnicow K, Davis-Hearn M, Smith M *et al.* (1997) Social-cognitive predictors of fruit and vegetable intake in children. *Health Psychol* **16**, 272–276.

10. Bere E & Klepp K-I (2005) Changes in accessibility and preferences predict children's future fruit and vegetable intake. *Int J Behav Nutr Phys Act* **2**, 15.
11. Russell CG & Worsley A (2007) Do children's food preferences align with dietary recommendations? *Public Health Nutr* **10**, 1223–1233.
12. Skinner J, Carruth BR, Wendy B *et al.* (2002) Children's food preferences: a longitudinal analysis. *J Am Diet Assoc* **102**, 1638–1647.
13. Poelman AAM & Delahunty CM (2011) The effect of preparation method and typicality of colour on children's acceptance for vegetables. *Food Qual Prefer* **22**, 355–364.
14. Zeinstra G, Koelen MA, Kok FJ *et al.* (2010) Parental child-feeding strategies in relation to Dutch children's fruit and vegetable consumption. *Public Health Nutr* **13**, 787–796.
15. Cashdan E (1994) A sensitive period for learning about food. *Hum Nat* **5**, 279–291.
16. Birch LL & Marlin DW (1982) I don't like it; I never tried it: effects of exposure on two-year-old children's food preferences. *Appetite* **3**, 353–360.
17. Nicklaus S, Boggio V, Chabanet C *et al.* (2004) A prospective study of food preferences in childhood. *Food Qual Prefer* **15**, 805–818.
18. Unusan N (2006) University students' food preference and practice now and during childhood. *Food Qual Prefer* **17**, 362–368.
19. Lakkakula A, Geaghan J, Zanovec M *et al.* (2010) Repeated taste exposure increases liking for vegetables by low-income elementary school children. *Appetite* **55**, 226–231.
20. Reinaerts E, de Nooijer J, Candel M *et al.* (2007) Explaining school children's fruit and vegetable consumption: the contribution of availability, accessibility, exposure, parental consumption and habit in addition to psychosocial factors. *Appetite* **48**, 248–258.
21. Liem DG & De Graaf C (2004) Sweet and sour preferences in young children and adults: role of repeated exposure. *Physiol Behav* **15**, 421–429.
22. Wardle J, Cooke IJ, Gibson EL *et al.* (2003) Increasing children's acceptance of vegetables; a randomized trial of parent-led exposure. *Appetite* **40**, 155–162.
23. Wardle J, Herrera ML, Cooke L *et al.* (2003) Modifying children's food preferences: the effects of exposure and reward on acceptance of an unfamiliar vegetable. *Eur J Clin Nutr* **57**, 341–348.
24. Peters J, Sinn N, Campbell K *et al.* (2012) Parental influences on the diets of 2–5-year-old children: systematic review of interventions. *Early Child Dev Care* **182**, 837–857.
25. Stratton P & Bromley K (1999) Families' accounts of the causal processes in food choice. *Appetite* **33**, 89–108.
26. Hart KH, Herriot A, Bishop JA *et al.* (2003) Promoting healthy diet and exercise patterns amongst primary school children: a qualitative investigation of parental perspectives. *J Hum Nutr Diet* **16**, 89–96.
27. Bourcier E, Bowen DJ, Meischke H *et al.* (2003) Evaluation of strategies used by family food preparers to influence healthy eating. *Appetite* **41**, 265–272.
28. Parke RD & Buriel R (1998) Socialization in the family: ethnic and ecological perspectives. In *Handbook of Child Psychology*, 5th ed., pp. 463–552 [W Damon and N Eisenberg, editors]. New York: John Wiley & Sons, Inc.
29. Eertmans A, Victoir A, Notelaers G *et al.* (2006) The Food Choice Questionnaire: factorial invariant over western urban populations? *Food Qual Prefer* **17**, 344–352.
30. Prescott J, Young O, O'Neill L *et al.* (2002) Motives for food choice: a comparison of consumers from Japan, Taiwan, Malaysia and New Zealand. *Food Qual Prefer* **13**, 489–495.
31. Januszewska R, Pieniak Z & Verbeke W (2011) Food choice questionnaire revisited in four countries. Does it still measure the same? *Appetite* **57**, 94–98.
32. Roos E, Lehto R & Ray C (2012) Parental family food choice motives and children's food intake. *Food Qual Prefer* **24**, 85–91.
33. Oellingrath IM, Hersleth M & Svendsen MV (2013) Association between parental motives for food choice and eating patterns of 12- to 13-year-old Norwegian children. *Public Health Nutr* **16**, 2023–2031.
34. Skinner JD, Ziegler P, Pac S *et al.* (2004) Meal and snack patterns of infants and toddlers. *J Am Diet Assoc* **104**, 1 Suppl. 1, S65–S70.
35. Ziegler P, Briefel R, Ponza M *et al.* (2006) Nutrient intakes and food patterns of toddlers' lunches and snacks: influence of location. *J Am Diet Assoc* **106**, 1 Suppl. 1, S124–S134.
36. Australian Bureau of Statistics (1998) *1996 Census of Population and Housing: Socioeconomic Indexes for Areas*. Canberra: AGPS.
37. Koivisto UK & Sjöden P-O (1997) Reasons for serving of foods and parental dimensions of food likes and dislikes in Swedish families with children aged 2–17. *Scand J Nutr* **41**, 27–32.
38. Grusec JE (2002) Parental socialization and children's acquisition of values. In *Handbook of Parenting*, 2nd ed., pp. 143–168 [MH Bornstein, editor]. Mahwah, NJ: Lawrence Erlbaum Associates.
39. Aktas AY (2006) The effects of television food advertisement on children's food purchasing requests. *Pediatr Int* **48**, 138–145.
40. Munro BH (2001) *Statistical Methods for Health Care Research*, 4th ed. Philadelphia, PA: Lippincott, Williams and Wilkins.
41. Cohen JA (1960) A coefficient of agreement for nominal scales. *Educ Psychol Meas* **20**, 37–46.
42. Australian Bureau of Statistics (2001) *Census of Population and Housing (Australia: 2001)*. Canberra: ABS.
43. Maubach N, Hoek J & McCreanor T (2009) An exploration of parents' food purchasing behaviours. *Appetite* **53**, 297–302.
44. De Bourdeaudhuij I & Van Oost P (1998) Family members' influence on decision making about food: differences in perception and relationship with healthy eating. *Am J Health Promot* **13**, 73–81.
45. Koivisto U-K & Sjöden P-O (1996) Reasons for rejection of food items in Swedish families with children aged 2–17. *Appetite* **26**, 89–103.
46. Birch LL (1999) Development of food preferences. *Annu Rev Nutr* **19**, 41–62.
47. Bouhhal S, Chabanet C, Issanchou S *et al.* (2013) Salt content impacts food preferences and intake among children. *PLoS One* **8**, e53971.
48. Liem DG, Mars M & De Graaf C (2003) Sweet preferences and sugar consumption of 4- and 5-year old children: role of parents. *Appetite* **43**, 235–245.
49. Birch LL (1992) Children's preferences for high-fat foods. *Nutr Rev* **50**, 249–255.
50. Ricketts CD (1997) Fat preferences, dietary fat intake and body composition in children. *Eur J Clin Nutr* **51**, 778–781.
51. Jensen JM (1995) Children's purchase requests and parental responses: results from an exploratory study in Denmark. *Eur Adv Consum Res* **2**, 54–60.
52. Vereecken CA, Haerens L, De Bourdeaudhuij I *et al.* (2010) The relationship between children's home food environment and dietary patterns in childhood and adolescence. *Public Health Nutr* **13**, 1729–1735.
53. HENDY HM, WILLIAMS KE, CAMISE TS *et al.* (2009) The Parent Mealtime Action Scale (PMAS). Development and association with children's diet and weight. *Appetite* **52**, 328–339.
54. Campbell K, Crawford D, Jackson M *et al.* (2002) Family food environments of 5–6 year-old-children: does

- socioeconomic status make a difference? *Asia Pac J Clin Nutr* **11**, Suppl. 3, S552–S561.
55. St John Alderson T & Ogden J (1999) What do mothers feed their children and why? *Health Educ Res* **14**, 717–727.
56. Galloway AT, Fiorito LM, Francis LA *et al.* (2006) 'Finish your soup': counterproductive effects of pressuring children to eat on intake and affect. *Appetite* **46**, 318–323.
57. Cox DN, Anderson AS, Lean ME *et al.* (1998) UK consumer attitudes, beliefs and barriers to increasing fruit and vegetable consumption. *Public Health Nutr* **1**, 61–68.
58. Quan T, Salomon J, Nitzke S *et al.* (2000) Behaviors of low-income mothers related to fruit and vegetable consumption. *J Am Diet Assoc* **100**, 567–570.
59. Lennernäs M, Fjellström C, Becker W *et al.* (1997) Influences on food choice perceived to be important by nationally-representative samples of adults in the European Union. *Eur J Clin Nutr* **51**, Suppl. 2, S8–S15.
60. McIntosh WA, Kubena KS, Tolle G *et al.* (2010) Mothers and meals. The effects of mothers' meal planning and shopping motivations on children's participation in family meals. *Appetite* **55**, 623–628.