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Short communication

Familiarity with and affective responses to foods in 8–11-year-old children. The role of food neophobia and parental education ☆

Sari Mustonen [a,b,*], Patty Oerlemans [a,1], Hely Tuorila [a]

[a] Department of Food and Environmental Sciences, P.O. Box 66, University of Helsinki, FI-00014 Helsinki, Finland
[b] Valio Ltd., R&D, P.O. Box 30, FI-00039 Valio, Finland

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ABSTRACT

The present study investigated whether the familiarity with and affective responses to foods are predicted by the individual trait food neophobia and by parental education in school children. The cross-sectional data collection involved children ($N = 208$, 8- and 11-year-old) from Helsinki, and their parents. A questionnaire assessing children's food neophobia with Food Neophobia Scale (FNS), and familiarity with and affective responses to 36 foods was completed by parents. Children with low FNS were familiar with a larger number of foods than those with high FNS. High FNS was associated with low pleasantness assessment of most food groups, including cheese, fruit/vegetables, fish, starch/cereals, and ethnic/exotic. Children of well educated parents had tasted a larger number of foods, thus displaying lower behavioral neophobia, and had lower FNS scores than children of less educated parents. Both low FNS scores and high parental education predicted the number of tasted foods. Parental education was not associated with pleasantness ratings (exception: cheese). To conclude, high food neophobia lowers the pleasantness ratings of foods, and parental education moderates behavioral neophobia.

Introduction

Children's food consumption is primarily motivated by food preferences (Birch, 1979). These, in turn, are influenced by a number of factors such as sensory properties (Dovey, Staples, Gibson, & Halford, 2008), age (Cooke & Wardle, 2005), mother's preferences (Skinner, Carruth, Bounds, & Ziegler, 2002) and peers (Birch, 1980). Flavor preferences established early in life track into later childhood (Mennella, Pepino, & Reed, 2005), affecting the development of eating habits which play an important role in determining individual diets in the adulthood (Mikkilä, Räsänen, Raitakari, Pietinen, & Viikari, 2004).

Food neophobia is defined as avoidance of, and reluctance to taste, unfamiliar foods (Pliner & Salvy, 2006). It is often measured by the Food Neophobia Scale (FNS) that quantifies the disposition to act in a neophobic way (Pliner & Hobden, 1992) and may lead to overt neophobic behavior. Such a behavioral pattern may negatively affect the variety of foods consumed. In two studies of Swedish families on children aged from 2–17-year-old, higher neophobia was associated with fewer uncommon foods being served and fewer foods being tried (Koivisto Hursti & Sjöden, 1997; Koivisto & Sjöden 1996). However, a highly neophobic child does not necessarily have a limited dietary repertoire provided that he/she has been consistently familiarized with a wide range of foods (Cooke, Carnell, & Wardle, 2006). Thus, parents can alleviate the consequences of the trait food neophobia. Well educated parents may be better prepared for investing their effort for such activities.

In 2–8-year-old children, neophobia was negatively related to the number of foods liked and positively related to the number of foods disliked (Skinner et al., 2002). In a study of young Finnish adults, high food neophobia predicted low pleasantness of foods with significance to health, in particular fish and vegetable dishes (Knaapila et al., 2011). Thus, lower hedonic experience from foods may characterize the life of neophobic individuals, but to our knowledge, no research data are available concerning children's hedonic responses to a wide range of everyday food categories.

In the present paper, the term *trait neophobia* refers to a person's character defined by the FNS score, and the term *behavioral neophobia* refers to the overt neophobic behavior. Affective responses to a wide range of unfamiliar and familiar foods were predicted by the trait food neophobia and by parental education. Similarly, the number of tasted foods (behavioral neophobia) was predicted by these factors.

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* Corresponding author.
E-mail address: sari.mustonen@valio.fi (S. Mustonen).
[1] Leidse Onderwijs Instellingen, P.O. Box 4200, 2350 CA Leiderdorp, The Netherlands.

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Methods

The data were collected as an initial part of a 2-year follow-up study (baseline measurements) investigating the effect of sensory education on school children's chemosensory and food-related perceptions and behaviors (Mustonen, Rantanen, & Tuorila, 2009).

Subjects

The subjects were pupils at 2nd (8-year-old) or 5th (11-year-old) grade in Viikki Teacher Training School at Helsinki University and Puistola Primary school in Helsinki. Among the initially 244 recruited subjects (93 from the 2nd and 151 from the 5th grade), data were complete for 208 subjects (102 boys, 106 girls) whose data were used in analyses. No specific backgrounds could be identified that would account for the loss in 36 responses. Of the children, 84 were 8-year-olds and 124 were 11-year-olds.

The study protocol followed the general principles of sensory testing in our laboratory, approved by the ethical committee of the Faculty of Agriculture and Forestry. An additional approval was applied as the subjects were minors (under 18 years). The parents signed an informed consent before the study began. The subjects themselves gave a verbal assent to participate.

Data collection

The parents filled in a questionnaire assessing subjects' perceptions of pleasantness of and familiarity with foods, level of food neophobia and more detailed information of eating behavior (the latter not reported).

The questionnaire started with questions on children's age, gender, height and weight, and demographics on the parents, including their education level. Then parents rated how familiar their child was with 36 foods, using a 5-point scale: 1 = 'He/she does not recognize this product', 2 = 'He/she recognizes the product, but has not tasted it', 3 = 'He/she has tasted this product', 4 = 'He/she occasionally eats this product', and 5 = 'He/she regularly eats this product' (Tuorila, Lähteenmäki, Pohjalainen, & Lotti, 2001). The parents also rated how pleasant/unpleasant their child finds the same 36 foods on a 7-point scale: 1 = 'very unpleasant', 2 = 'moderately unpleasant', 3 = 'slightly unpleasant', 4 = 'neither pleasant nor unpleasant', 5 = 'slightly pleasant', 6 = 'moderately pleasant', 7 = 'very pleasant'. Also the option 'has not tasted' was possible.

Following was the Food Neophobia Scale (FNS; Pliner & Hobden, 1992). The FNS is a validated 10-item set of statements for and against unfamiliar foods, which, when re-phrased to be filled in by the parents, has been proven to be a good measure of children's food neophobia (Pliner, 1994). The scores range from 10 (low neophobia) to 70 (high neophobia).

Data analysis

The age and gender effects on pleasantness and familiarity of the foods were analyzed with two-way ANOVA. The relationship between the pleasantness and familiarity ratings, and between children's FNS and willingness to try foods, were analyzed with a Pearson correlation. Subjects were divided into high neophobia vs. low neophobia groups, based on median score, 38. The effect of FNS level on the pleasantness and familiarity of the foods was analyzed with one-way ANOVA. Subjects were divided into two groups based on the parental education level: high (college level or university) and low (vocational school/basic education). The effect of parental education level on the pleasantness and familiarity of the foods was analyzed with one-way ANOVA.

Responses to 36 foods in the questionnaire were investigated per food group. The food groups, defined based on pleasantness ratings using factor analysis, were 'cheese', 'fruit/vegetables', 'meat', 'fish', 'starch/cereals', and 'ethnic/exotic'. The foods in the 'ethnic/ exotic' food group were: shiitake, guava, kidney foods, buckwheat, couscous, eggplant, and sushi. Cronbach's alpha of pleasantness of the five subgroups ranged from 0.60 to 0.77.

Each subject got a familiarity score that was calculated such that responses 'not recognized' and 'recognized, but not tasted before' were re-coded as 0 and the responses 'has tasted', eats occasionally', and 'eats regularly' were re-coded as 1. Thus, the score could vary from 0 to 36. The bottom 33.3% of the 36 foods, thus the 12 most unfamiliar foods (Mozzarella, blue cheese, bratwurst, goat cheese, eggplant, couscous, mustard herring, buckwheat, shiitake, sushi, guava, and kidney foods), were used to investigate the effect of food neophobia and parental education level on the number of tasted foods with one-way ANOVAs.

A linear regression analysis was used to predict the number of tasted unfamiliar foods (max.12) and pleasantness of food groups by entering food neophobia score and parental education level as predictors.

All analyses were done with PASW®, version 19, and a value of $p \leqslant 0.05$ was taken as the level of significance throughout. The F-values and p-values are reported only for the significant results.

Results

Relationship between the food-related measurements

The mean ratings of familiarity and pleasantness of the 36 foods varied from 1.4–4.5 (mean familiarity) and 2.9–6.2 (mean pleasantness). These mean ratings were positively correlated (Pearson's $r = .43$). The number of subjects familiar with a food based on their parents' reporting (3–5 on the familiarity scale: rating 3 = "he/she has tasted the product") varied from 208 (5 most familiar foods) to 21 (2 least familiar foods). In the lowest tertile (33% of the subjects) the number of subjects familiar with the foods (based on parents' reporting) was 21–164. Food neophobia score correlated negatively with the number of tasted foods (max. 36) ($r = -.54$).

The differences between age groups and genders

Based on parents' reporting, the 11-year-olds were familiar with a larger number of foods than the 8-year-olds [$F(1204) = 5.8$, $p = 0.02$]. No gender effect or interaction between age group and gender was found. No difference in mean ratings of pleasantness between age groups or genders was found, nor an interaction between age group and gender.

Factors influencing children's experience and rated pleasantness of foods

Those with low neophobia were familiar with a larger number of foods than those with high neophobia [$F(1190) = 15.8$, $p < 0.001$]. Food neophobia was significantly related to ratings of pleasantness: those with low neophobia rated all foods higher in pleasantness (grand mean 5.5) compared to those with high neophobia (grand mean 5.1) [$F(1190) = 17.1$, $p < 0.001$].

Parental educational level affected children's neophobia score: the children whose parents had lower education were more neophobic (mean FNS = 38) than were those children whose parents were more highly educated (college level or university) (mean FNS = 35) [$F(1204) = 6.7$, $p = 0.01$].