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Research report

Prediction of children's flavour preferences. Effect of age and stability in reported preferences

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ABSTRACT

The present study investigated whether children were able to communicate stable flavour preferences and whether mothers' ability to correctly identify their child's flavour preferences is related to the stability of their child's flavour preferences. On 2 consecutive days, 75 girls and 77 boys (3–10 years, mean age = 7.1 ± 2.3 years) carried out a preference ranking task for five ice-cream flavours: mint, coffee, chocolate and two variants of vanilla. Without input from their child, mothers ranked four of these flavours according to their own understanding of their child's flavour preferences. Spearman rank order correlations suggest that older aged children (5–10 years) have more stable flavour preferences than younger aged children (3–5 years) ($p < 0.05$). Only 39% of mothers were able to correctly predict children's most preferred flavour, but significantly more parents (61%) were able to predict children's least preferred flavour ($p < 0.05$). Mothers' ability to correctly predict their children's least preferred flavour seemed to be facilitated by children's ability to communicate their least preferred flavours in a consistent manner ($p < 0.05$). It is recommended to apply proper sensory methodologies with children rather than relying on mothers' report when interested in children's likes. When interested in children's dislikes mothers' report might be suitable.

Introduction

In Western society, children have a large variety of foods to choose from. In order to guide children in selecting healthy foods, research on the determinants of children's food choice is needed. Previous research has suggested that when children are free to decide, their food choices are determined, for the most part, by their flavour preferences (Berg, Jonsson, Conner, & Lissner, 2003; Birch & Fisher, 1995; Birch, 1979b; Harvey-Berino et al., 1997; Olson & Gemmill, 1981).

A variety of precise and reliable techniques to measure children's flavour preferences have been developed. Although some techniques use either illustrations or taste descriptions of food, most techniques require that children actually taste a range of different foods. Research suggests that young children (>3 years) are capable of performing sensory preference tests such as paired comparisons or simple rank ordering tasks (Birch, 1979a, 1980a,b; Birch & Marlin, 1982; Guinard, 2001; Guthrie, Rapoport, & Wardle, 2000; Kroll, 1990; Leon, Marcuz, Couronne, & Koster, 1999; Liem, Mars, & De Graaf, 2004; Olson & Gemmill, 1981; Sullivan & Birch, 1990). Older children (from 6 years of age) are also capable of using category scales that range from "not liked at all" to "very liked" (Guinard, 2001; Kroll, 1990) and similarity tests (Liem & Zandstra, 2010). These methods have been shown to produce precise and reliable data which can predict children's food choices and consumption (Birch, 1979b, 1980a). However, sensory taste tests are relatively labour intensive and expensive. Children need to be tested individually by a trained interviewer in a room suitable for sensory taste testing with children.

An alternative technique is to ask mothers to report their children's flavour preferences by means of a questionnaire. A questionnaire has a number of advantages: the researcher does not need to see each child individually, no food needs to be prepared and no specific facilities are required. Furthermore, questionnaires can be distributed across a wide geographical area and in large quantities by either mail, e-mail or through on-line surveys.

Unfortunately, research suggests that mothers have difficulties with identifying their children's flavour preferences within one category of food (i.e. different flavours of the same kind of food). For example, in one study with a variety of different fruits, vegetables, sandwiches and snacks, Birch (1980) found that only 20% of mothers were able to correctly identify their children's favourite foods. Remarkably, mothers' predictions appeared to be closer related to their own food preferences than to those of their children (Birch, 1980b; Ritchey & Olson, 1983).

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With mothers as an important gatekeeper to their children's food, it is surprising that mothers perform poorly when asked to identify their children's food preferences. Mothers' poor ability to predict their children's food preferences could be due to either their children's inability to express their flavour preferences in a consistent manner, or, alternatively, the fast rate at which children change their preferences which may make it difficult for mothers to keep track of them.

Sensory research suggests that the level of consistency with respect to children's flavour preferences increases with age. Leon et al. (1999) repeatedly conducted paired preference tests, hedonic categorisation and ranking tests with 4–10-year-old children. She consistently found that 4–5-year-old children gave less repeatable data compared to older aged children (Leon et al., 1999). Additionally, Liem et al. (2004) suggested that 4-year-olds (when conducting paired and rank order tests for flavour preferences) provided less stable responses than 5-year-olds. In other studies, this positive relationship between consistency and age is less evident (Kimmel, Sigman-Grant, & Guinard, 1994).

Ideally the stability of children's flavour preferences should be tested across several days. Instable flavour preferences are more likely to occur with children who are in the process of shaping their flavour preferences. Stability of flavour preferences across several days has rarely been investigated (Guthrie et al., 2000; Leon et al., 1999). Taking these factors into account, research that aims to investigate the stability of children's flavour preferences should include (i) children across a broad age range, (ii) a range of similar stimuli and (iii) repeated measurement across several days.

In the present study we investigated whether mothers' ability to correctly identify their child's flavour preferences is related to the stability of their child's reported preferences for a range of well-liked products. Stability of flavour preferences was measured over a 2-day period. In order to investigate age-related differences, children ranged from 3 to 10 years of age.

Method

Participants

Children ($n = 160$) from the surroundings of London (UK) were recruited for the study. Eight children were excluded because either they did not complete all the sensory tests ($n = 4$), or the mothers did not complete all of the questionnaires ($n = 4$). This resulted in a sample of 152 children (7.1 ± 2.3 years, 75 girls, 77 boys) (see Table 1).

General overview

Children were tested on 2 consecutive days, during which they carried out a rank order test (Birch, 1979a) with five different flavours of ice-cream. On the first day mothers filled out a questionnaire concerning the flavour preferences of their children. Mothers were seated in a separate room with their child's back visible to them through a glass window. The study was carried out according the ESOMAR ethical standards embodied in the ICC/ESOMAR International Code of marketing and Social Research Practice (www.esomar.org). Informed consent was obtained from the participants prior to participation.

Stimuli

Five unbranded, commercially available ice-creams with five different flavours (mint, coffee, chocolate and two variants of vanilla) (Unilever, UK) were presented to the children. The flavours were well known within the UK. The ice-creams were taken out of the refrigerator shortly before presentation and presented in small, 6 cm × 7 cm cups which were covered with a lid. Just before each child tasted the ice-cream, the lid was removed and the researcher scooped a small quantity onto a plastic spoon in order to ensure that each child consumed the same amount.

Procedures

Sensory tests with children

Children carried out a rank order (Birch, 1979a) test over a 2-day period. Children were tested individually by an adult who had been trained in advance to become familiar with the testing procedures. Before the actual test began, children were familiarized with the procedure by asking them the following: "*I'd like you to show me the face you make when you eat something that tastes nice*". This was repeated for the tastes "bad" and "okay". Next, pictures of three faces were placed on the table. The interviewer asked the child: "*Now which face would you make when something tastes nice*"? Similar questions were asked for "*tastes bad*" and "*tastes okay*." Subsequently, the interviewer pointed to one of the pictures and asked the child: "*This picture shows the face you make when you eat something that tastes...*"? When it became apparent that everything was clear to the child, the actual task started.

The ice-creams were presented one at a time in a random order. Children tasted one scoop of ice-cream and then assigned it to one of the three categories (bad, okay, nice). This procedure was completed for all five flavours. Next children were asked to rank the ice-creams in order from most preferred to least preferred within each category, starting with those ice-creams which they had placed within the category "nice".

Mothers' prediction of child's preferences

On the first day children performed the sensory test mothers completed a questionnaire in which they were asked to indicate their child's most preferred ice-cream flavour. Subsequently, they were asked to rank order the flavours according to their

Table 1
Flavour preferences (mean rank number ± SEM, 5 = least preferred, 1 = most preferred) for different ice-creams, divided by age group and day of testing.

Age, gender		Coffee	Vanilla	Vanilla[1]	Chocolate	Mint
3–4 years	Day 1	3.9 ± 0.21^{a}	2.9 ± 0.23^{b}	2.9 ± 0.21^{b}	2.6 ± 0.22^{b}	2.7 ± 0.25^{b}
23 girls, 13 boys	Day 2	4.0 ± 0.18^{a}	2.9 ± 0.23^{b}	2.7 ± 0.21^{b}	2.8 ± 0.23^{b}	2.6 ± 0.26^{b}
5–6 years	Day 1	4.3 ± 0.20^{a}	2.7 ± 0.20^{b}	2.8 ± 0.20^{b}	2.7 ± 0.20^{b}	2.6 ± 0.26^{b}
14 girls, 22 boys	Day 2	4.4 ± 0.20^{a}	2.7 ± 0.20^{b}	2.9 ± 0.19^{b}	2.7 ± 0.21^{b}	2.4 ± 0.23^{b}
7–8 years	Day 1	4.5 ± 0.17^{a}	2.9 ± 0.19^{b}	3.0 ± 0.17^{b}	2.3 ± 0.17^{b}	2.3 ± 0.23^{b}
16 girls, 24 boys	Day 2	4.5 ± 0.18^{a}	2.9 ± 0.18^{b}	2.8 ± 0.16^{b}	2.6 ± 0.19^{b}	2.2 ± 0.22^{b}
9–10 years	Day 1	4.4 ± 0.18^{a}	2.8 ± 0.19^{b}	3.0 ± 0.18^{b}	2.8 ± 0.19^{b}	2.0 ± 0.22^{b}
22 girls, 18 boys	Day 2	4.2 ± 0.23^{a}	2.8 ± 0.18^{b}	3.1 ± 0.19^{b}	2.9 ± 0.19^{b}	2.1 ± 0.20^{c}

Different letters in the same row are significantly different from each other ($p < 0.05$), as tested with Friedman post hoc analysis (Siegel & Castellan, 1988).
[1] Vanilla ice-cream was used in two varieties.