Research report

Food choice: The battle between package, taste and consumption situation

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ABSTRACT

The present study compared how intrinsic (sensory) and extrinsic (packaging) product properties influence actual food choice in combination with the concept of product appropriateness in a specific consumption context. Food choice of seven test products was measured in three breakfast sessions within a simulated cafeteria setting with subsequent product consumption. Test products were five breakfast drinks and two dessert products considered as inappropriate for breakfast. One hundred and three participants took part in a blind taste session, after which they chose one out of the seven foods to consume for breakfast. In a second session (familiar package session), the same participants based their choice on the package of the seven foods they tasted in the first session. An additional group of 65 participants took part in a third naïve package session, where they chose just on the basis of package without being previously exposed to the foods. Results showed that food choices in the naïve package session were guided by the package that labelled the products as "breakfast product". Food choices in the blind session were strongly correlated (r = 0.8) with the liking of the products. Food choice in the "familiar package session" lay between the blind and naïve package session. It is concluded that food choice in a simulated cafeteria setting is guided by extrinsic (package) as well as intrinsic (sensory) properties and both can act as a cue for product appropriateness given a specific consumption context. Depending on the salience of either intrinsic or extrinsic properties during the choice moment their impact on choice is stronger.

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Introduction

Food choice is influenced by both intrinsic (sensory properties) and extrinsic (packaging and label) product properties. In various laboratory (Garcia-Bailo, Toguri, Eny, & El-Sohemy, 2009; Hasselbalch, Heitmann, Kyvik, & Sorensen, 2008) and real life (De Graaf et al., 2005) studies, liking ratings have been shown to relate to food choice and food intake. The effect of packaging information on food choice has recently been assessed in an elegant study by Hoppert, Mai, Zahn, Hoffmann, and Rohm (2012), who showed that packaging information (e.g. fat content label) influenced food choice in a laboratory setting. This study used multiple repeated choices from a fixed set of products, but without consuming the product afterwards. It has been argued that in sensory consumer research more emphasis is needed on research that shows real behavioural or physiological effects in more natural situations than the laboratory (Köster, 2009;

Meiselman, MacFie, & Meiselman, 1996). To the best of our knowledge the effect of packaging has not been studied in a real life choice situation, where participants consume the chosen product afterwards.

In addition to product-related food properties, situational cues as for instance appropriateness (i.e. whether a food product matches the consumption context) seem to be relevant in food choice (Cardello & Schutz, 1996; Cardello, Schutz, Snow, & Lesher, 2000). For example, it has been shown that breakfast items were preferred in the morning compared with dinner items (Birch, Billman, & Richards, 1984). However, this could not be replicated by Kramer, Rock, and Engell (1992) thus the robustness of an effect of consumption context appropriateness in food choice is still unclear. Extrinsic properties of a food such as the package can be used to communicate appropriateness for a certain consumption context, e.g. labelled as 'breakfast drink'. We do not know how appropriateness of the test products will interact with the intrinsic and extrinsic product properties on food choice in a real life choice situation.

The objective of the present study was to assess the effect of sensory properties, package and appropriateness on food choice in a simulated cafeteria setting and with participants consuming the chosen product afterwards. The study thereby adds ecological va-

lidity to food choice studies performed within a traditional laboratory space, as the cafeteria setting does better approximate food choice behaviour in a real-world setting. We examined choice from a set of seven products (five commercially available breakfast drinks and two dessert products) in three breakfast sessions: one blind product session and two package sessions. In the blind session participants chose their preferred product based just on tasting the products. In the familiar package session, the same participant group chose one product to consume out of the same set of products; however, this time their choice was based on the package. To explore the sole effect of packaging on choice, a different group of participants took part in a package session without previous consumption of the test products, i.e. the naïve package session.

Methods

Participants

One hundred and sixty-eight healthy Dutch-speaking adults from Wageningen and its environs were included in this study. Inclusion criteria were regular (one to nine times per year) or frequent (>10 times/year) use of breakfast drinks, age between 18 and 55 years and a BMI between 18.5 and 27 kg/m^2. From the 168 participants, 103 (M/F: 51/52, age: 25.6 ± 8.5 years, BMI: 22 ± 1.9 kg/m^2) took part in the blind session and in the familiar package session, and 65 participants (M/F: 16/49, age: 26 ± 9.7 years, BMI: 21.7 ± 2 kg/m^2) took part only in the naïve package session. The two groups were similar in mean age and BMI. Sixty-seven per cent of the first participant group were regular users of breakfast drinks and 33% were frequent users. From the second group, participating only in the naïve package session, 57% were regular users and 25% were frequent users.

Test products

The test products were all commercially available products in supermarkets and consisted of five breakfast drinks and two dairy dessert products (see Table 1). Four breakfast drinks were yoghurt-based (two liquid and two more viscous) and one was fruit based. Desserts were chosen for their (in)congruency in terms of intrinsic and extrinsic properties compared with the breakfast drinks. More specifically, one of the desserts had an appropriate taste and texture but an inappropriate package for breakfast. This product was creamy cranberry flavoured yoghurt (more indulgent product compared with plain yoghurt), it was labelled as "creamy yoghurt" and in supermarkets it was placed in the shelf with dessert products. The other dessert product (vla) had both an inappropriate package and taste for breakfast. Vla is a vanilla custard which is a typical dessert product for everyday dinner meals in The Netherlands, something that is solidly grounded in cultural food tradition. The desserts differed from the breakfast drinks in e.g. creaminess and sweetness. To verify our assumptions on the appropriateness of the products we measured perceived product appropriateness by a group of volunteers (n = 26, different ones than those who participated in the study) after the study was conducted. The appropriateness of the test products was evaluated for eight different food use situations (for breakfast, when tired, when eating alone, for a snack, have little time to eat, for lunch, for dinner, for dessert). To measure appropriateness we used an adopted version of the appropriateness measurement tool published by Cardello and Schutz (1996). The appropriateness of the products for eight different food use situations was evaluated on a 7-point scale anchored on the left side by "not appropriate at all" and on the right side by "very appropriate," the scores were translated from 0 to 6. The package of each test product was presented as an image. Figure 1 shows the appropriateness evaluation of all seven test products for the two consumption situations of interest, i.e. breakfast and dessert. Products 6 and 7 were evaluated as

the most appropriate dessert products $(M_{product6} = 5.9\ (0.4), M_{product7} = 5.8\ (0.4))$. In comparison with products 6 and 7, we observed that products 1–5 had an average lower than 2 when their appropriateness as desserts products were evaluated. Similarly, we observed that products 6 and 7 were evaluated as being less appropriate for the consumption situation 'breakfast' $(M_{product6} = 2.8\ (1.5), M_{product7} = 1.8\ (1.6))$ as compared with products 1–5. Before participants took part in the blind session, they scored liking of the test product in a test session not described in this report. To assess liking, each sample was presented in a 60 ml transparent cup containing 30 ml of each product and a teaspoon. Participants were instructed to stir the sample with the spoon, then take a spoonful to taste the product and indicate how much they liked the product by means of a 9-point hedonic scale (1 = "dislike extremely", 9 = "like extremely"). The order by which each participant received each sample was randomized. Participants rinsed their palate with water and consumed an unsalted cracker between each sample.

Procedure

Actual food choice was measured in three breakfast sessions, one blind session and two package sessions, in the Restaurant of the Future (RotF) in Wageningen. The RotF is a field laboratory that allows studying food choice behaviour in settings that approximate real-world situations. The test was run in a test room converted to a cafeteria at a university campus. The breakfast session differed from real life in that only the seven test products were available and participants did not have to purchase the chosen products. Participants were not allowed to eat 2 hours before the start of each test session. All testing sessions lasted 45–60 min and were conducted between 8:00 and 10:30 a.m. to ensure that the "breakfast context" would be salient. All participants were informed that they could consume the selected product after choosing.

During the first session participants were instructed to taste all seven test products and to select one to consume for breakfast. The test products were presented without any packaging information (blind session). Subsequently, the selected product was provided for consumption to the participants in oblique cups containing a standard serving for one person.

In the second session, after an interval of 1 week, actual food choice was measured based on packaging (familiar package session). In this session participants viewed just the packaging. Packaging contained labels, brand and product information and likely evoked existing associations during previous experience with the products. Participants were asked to individually come to a shelf-fridge with all the test products and choose the one they would like to have for breakfast. The order of the products in the shelves was randomized across participants to avoid any effect of structure.

In the third session (the naïve package session), an additional group of participants took part in a package session with the same procedure as in the familiar package session. In contrast to the previous group, these participants had not tasted the test products before as part of the experiment.

Data analysis

SPSS 20.0 (IBM, New York, USA) was used for statistical analyses. Chi square goodness of fit was used to test if the distribution of food choice differed between the three sessions (blind session, familiar package session, naïve package session) based on frequencies, i.e. the number of participants who chose a particular product. A mixed model ANOVA together with Tukey's test was performed to investigate differences in liking between products. To examine the relationship between liking scores and food choice, correlation analysis was applied.