

## Original Article

# Effects of variety and repeated in-home consumption on product acceptance

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The present study was designed to investigate the effect of variety on long-term product acceptance and consumption in a home-use situation. Subjects ( $N = 105$ ) consumed a meat sauce once a week at dinner at home for a period of 10 weeks. Three variety groups were designed. The monotony group ( $N = 45$ ) consistently received the same flavour of meat sauce across all 10 weeks; the imposed variation group ( $N = 30$ ) received one from three different flavours of the meat sauce in random order, and the free choice ( $N = 30$ ) in variation group was allowed to choose among three flavours of the meat sauce. Results showed a substantial increase in boredom and decline in acceptance ratings after repeated consumption. As hypothesized, this effect was the largest for the monotony group and was least pronounced in the free-choice group, with the imposed variation group in between. Consumption data were in line with these acceptance ratings; the monotony group consumed less of the food than the free-choice group over that time. In conclusion, repeated consumption of a food product only once a week at home resulted in a remarkable increase of boredom over time. The boredom effect was the largest for subjects who consistently received the same food, and was least pronounced for subjects who were allowed to choose among three different flavours of the food.

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## Introduction

Laboratory sensory tests, in which subjects test small food samples in short exposure periods, were originally developed to predict long-term product acceptance and consumption. The predictive validity of these laboratory sensory tests on consumption and long-term acceptability in free-living situations has been

questioned for years (Dailliant & Issanchou, 1991; Goldman, 1994; Griffin & Stauffer, 1990; Lucas & Bellisle, 1987; Meiselman, 1992; Monneuse *et al.*, 1991; Pérez *et al.*, 1994; Popper *et al.*, 1989; Zandstra *et al.*, 1999).

There is ample evidence that respondents change their opinions about a food product after repeated exposure to the same food product over longer periods of time (Kamen & Peryam, 1961; Porcherot & Issanchou, 1998; Rolls & De Waal, 1985; Schutz & Pilgrim, 1958; Siegel & Pilgrim, 1958; Vickers & Holton, 1998). These changes in pleasantness might occur by reinforcing post-ingestive effects (Birch *et al.*, 1990; Bolles *et al.*, 1981; Rozin *et al.*, 1998; Sclafani, 1997; Zellner *et al.*, 1983) or “mere exposure” effects (Bornstein, 1989; Zajonc, 1968), whereby repeated exposure leads to an increased liking (Crandall, 1984; Porcherot & Issanchou, 1998; Stang, 1974), or the other way around, by product irritation

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(e.g. boredom), whereby repeated exposure leads to a decreased liking (Hetherington *et al.*, 1998; Lévy & Köster, 1999; Siegel & Pilgrim, 1958; Van Trijp, Note 1). A better understanding of both phenomena is of importance for product marketers, particularly those involved in fast moving consumer goods (e.g. foods). They need to know not only whether consumers initially like the food product, but above all whether consumers continue to like and buy the food product after repeated consumption.

To what extent repeated consumption affects food acceptance may depend on the availability of different varieties of particular foods and the degree of freedom of choice (Deci & Ryan, 1987; Kamen & Peryam, 1961; Pliner *et al.*, 1980). The number of studies which have focused on the effect of repeated in-home consumption on food product acceptance is quite limited (Lévy & Köster, 1999; Mela *et al.*, 1993; Porcherot & Issanchou, 1998; Stubenitsky *et al.*, 1999). The main purpose of this trial was therefore to determine long-term changes in hedonic responses under a normal domestic eating environment. A second purpose was to determine the effect of freedom of choice on long-term acceptance of foods. Three different variety groups were designed: a monotony group, an imposed variation group, and a free choice in variation group. As the food product, we chose a meat sauce for dinner with three different flavours.

## Materials and Methods

### Subjects

Subjects were 106 consumers recruited by advertisements in local papers and posters at student-flats and university buildings. After stratification for sex and age, subjects were randomly allocated to one of the three variety groups. Exceptions were cohabiting subjects, who were placed in the same group, and subjects who did not like a flavour (based on a short questionnaire before the start of the study), who were placed in the group which did not receive that specific flavour. In total, six subjects did not like a specific flavour: three subjects did not like curry, one subject did not like saté and two subjects did not like sweet-and-sour. One subject dropped out in the third week for personal reasons: his data were excluded from statistical analysis. Table 1 shows some characteristics of the 105 remaining subjects classified by group. Subjects were told that the study consisted of tasting and eating different meat sauces for dinner over a 10-week period at home. The study was approved by the Medical Ethical Committee of the Division of Human

Nutrition and Epidemiology, and subjects gave their informed consent prior to the study.

### Food product

A sauce for meats for dinner was used as the food product. We selected three meat sauces of the same brand that varied in flavour: curry, saté and sweet-and-sour. The meat sauces were supplied in branded one-person portions (285 gram/jar). The meat sauces were from the same batch and were commercially available in supermarkets at the time of the study. The nutritional composition of the sauces is given in Table 2. Subjects were randomly assigned to three groups to consume the meat sauce once a week at dinner at home across 10 weeks: (1) *Monotony* group consistently received the same meat sauce; curry ( $N=11$ ), saté ( $N=11$ ) or sweet-and-sour sauce ( $N=23$ ). The latter group comprised twice as much subjects since this group was also part of another study, of which the results are not relevant to this study. (2) *Imposed variation* group received the curry, saté and sweet-and-sour sauce in random order ( $N=30$ ). Different random orders were generated for each subject, with the restriction that each subject received each flavour at least three times. (3) *Free choice* in variation group was on every single consumption occasion allowed to choose among the curry, saté and sweet-and-sour sauce ( $N=30$ ).

**Table 1.** Subject characteristics classified by group (mean  $\pm$  SD)

	Monotony ( $N=45$ )	Imposed variation ( $N=30$ )	Free choice ( $N=30$ )
Age (years)	29.1 (11.2)	27.2 (11.4)	27.2 (11.8)
Height (cm)	176.5 (9.2)	177.6 (8.5)	178.4 (10.0)
Weight (kg)	70.5 (12.6)	72.2 (11.3)	70.3 (10.8)
BMI (kg/m <sup>2</sup> )	22.5 (3.0)	22.8 (3.1)	22.0 (2.4)
Men/women ( $N$ )	22/23	16/14	15/15

**Table 2.** Nutritional composition of the three meat sauces

g/100 g serving	Sweet-and-sour	Saté	Curry
Protein	0.5	5.0	0.5
Fat	0.1	8.0	1.0
Carbohydrate	11.0	16.5	12.0
Total energy (kJ)	200	660	250

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