Food Quality and Preference 28 (2013) 101–105

Contents lists available at SciVerse ScienceDirect

Food Quality and Preference

journal homepage: www.elsevier.com/locate/foodqual

The effect of reduced-fat labelling on chocolate expectations

J.E. Norton [a,*], P.J. Fryer [a], J.A. Parkinson [b]

[a] School of Chemical Engineering, University of Birmingham, Edgbaston, Birmingham B15 2TT, United Kingdom
[b] School of Psychology, Bangor University, Bangor, Gwynedd LL57 2AS, United Kingdom

ARTICLE INFO

Article history:
Received 15 March 2012
Received in revised form 2 August 2012
Accepted 3 August 2012
Available online 10 August 2012

Keywords:
Expectations
Liking
Sensory attributes
Consumption amount
Willingness-to-pay
Chocolate

ABSTRACT

Increasing global obesity has fuelled an increase in the production of foods that are lower in fat, sugar or calories. Understanding the consumer, particularly their expectations towards reduced-fat foods, is key when designing and marketing such products. The aim of the current study was to explore the relationship between chocolate labelling and expectations. Two identical standard chocolates were labelled as 'Milk Chocolate' and 'Reduced-fat Milk Chocolate'. Labelling a chocolate as 'reduced-fat' had a significant negative effect on ratings of expected liking, but did not affect ratings of actual liking, or ratings of sensory attributes. Exploratory analysis of the relationship between individual differences (including gender, age, BMI and DEBQ subscales) and expectations yielded no significant results. However, ratings of actual liking for both labelling conditions did correlate with intention to buy the product, and the price participants would be willing to pay for it. Anticipated consumption amount showed a tighter relationship with expectations for 'Reduced-fat Milk Chocolate'. The results indicate that expectations are critical in consumer acceptance of reduced-fat products. If a reduced-fat chocolate can be produced with matched sensory attributes, and consumers can be encouraged to purchase the product, actual liking should not be affected by the knowledge that the product is reduced in fat.

1. Introduction

1.1. Obesity and food fat content

Obesity is increasing throughout the world, with rises in prevalence of the disease being seen in the UK. According to National Health Service reports, in 2006 23.1% of men and 24.8% of women were classified as obese, as compared with 13.2% and 16.4% respectively in 1993. The health risks of obesity include the development of non-insulin dependent diabetes mellitus, hypertension, hyperlipidaemia, cardiovascular disease, coronary heart disease, stroke, gallbladder disease, arthritis and certain types of cancer (NHS, 2006). Increasing levels of obesity throughout the world has fuelled an increase in the production of foods that are lower in fat, sugar or calories. Reducing dietary fat is particularly important as fat is energy dense (fat contains approximately 9 kcal/g, whilst carbohydrates and proteins contain 4 kcal/g), but has a limited effect on suppressing appetite, compared with protein or carbohydrate (Egger & Swinburn, 1997), which may lead to 'passive consumption', in which excess energy is ingested without a large quantity of food being consumed (Prentice & Jebb, 1995). Therefore, reducing dietary fat may reduce energy intake and help prevent obesity effectively. This seems to be especially true for foods that are not part of the staple diet, and provide only limited nutritional benefits, including indulgent foods such as chocolate. As chocolate is notoriously high in calories its consumption may be detrimental to maintaining a healthy weight. Although reduced-fat chocolate is currently not available to the public, it is likely that in the near future a product will be developed (Norton, Fryer, Parkinson, & Cox, 2009; Norton & Fryer, in press), so it is important to consider how consumers will react to it.

It has been reported that consumers feel there is a reduction in taste quality associated with reduced-fat diets (Lloyd, Paisley, & Mela, 1995), so a critical issue in promoting healthy behaviour is in understanding the relationship between reduced-fat products and the expectations and preferences of consumers for those products. Consumption of reduced-fat chocolate may support healthy dietary behaviour, but only if consumers are willing to choose it against competing full-fat brands. Although consumers may be aware that fat should be avoided for protection of long-term health, expectations may be low for a chocolate that has been developed specifically to be lower in fat.

1.2. Labelling and expectations

In psychology, the construct of expectations was introduced by Tolman (1938), who used the concept of expected consequences of behaviour, as an explanatory variable to account for learning i.e. a behaviour occurs in response to expected pleasure. This has been

* Corresponding author. Tel.: +44 (0)121 414 5284; fax: +44 (0)121 414 5324.
E-mail address: Nortonje@bham.ac.uk (J.E. Norton).

0950-3293/$ - see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.foodqual.2012.08.004

refined over the years, but the basic tenet holds true that expectations have a powerful effect on behaviour and choice. Expectations play an important role in food choice and consumption as they may improve or degrade the perception of a product, even before it is tasted (Carlsmith & Aronson, 1963), with consumer satisfaction being strongly related to the degree of disparity between expectations and actual product performance (Deliza & MacFie, 1996). A well known example of how expectations can dominate the sensory experience is seen in the study by Morrot, Brochet, and Dubourdieu (2001): colouring white wine to look like red wine changed the taste perceptions, such that participants tended to use red wine descriptors to characterise the white wines.

There are a number of extrinsic cues used by consumers to judge products, with product labelling playing an important role, both providing brand information and information to consumers about ingredients and nutrition (Deliza & MacFie, 1996). If the consumer has no direct prior experience of the product then information contained in the product label has a greater impact on expectations. After choosing the product its sensory properties will be compared with those expected, so the consumer may confirm or disconfirm their expectation; both confirmation (matches expectation), and positive disconfirmation (better than expected) lead to satisfaction and repeated use, whilst negative disconfirmation (worse than expected) leads to dissatisfaction and rejection. For example, Torres-Moreno, Tarrega, Torrescasana, and Blanch (2012) examined consumer expectations for dark chocolate across several conditions. Being exposed to premium brand packaging raised the expectations of participants and these were fulfilled by the quality chocolate that was used for tasting. In contrast, standard brand packaging produced low expectations and a marked positive contrast once the sensory properties of the quality chocolate were experienced. As such, prior experience of brands has a significant influence on expectations and is therefore likely to influence purchasing decisions.

Separate from brand influence, informational content contained within *labelling* has been shown to influence anticipation and choice, and also sensory and hedonic perception during consumption (Kähkönen, Tuorila, & Rita, 1996; Light, Heymann, & Holt, 1992; Yeomans, Lartamo, Procter, Lee, & Gray, 2001). Kähkönen (2000) showed that receiving reduced-fat information during tasting decreased pleasantness ratings, and decreased fattiness, flavour intensity and melting-rate ratings for chocolate. However, whilst Kähkönen, Hakanpää, and Tuorila (1999) found that reduced-fat information led to lower expected melting-rate in chocolate, this information did not affect the pleasantness ratings of the chocolate bars following consumption. Further, Levin and Gaeth (1988) found that when information about fat content was framed in a positive way the product was rated more highly than when framed in a negative way. The influence of label framing can be appreciated through modern attempts to 'spin' products by adding adjectives and 'exotic' descriptors. For example, Wansink, van Ittersum, and Painter (2005) found that descriptive food names (geographic, nostalgic or sensory-related in nature, for example 'Traditional Cajun Red Beans with Rice') resulted in the belief that the meals were more appealing, tastier and more calorific than food presented with basic descriptive names (for example 'Red Beans and Rice').

1.3. Current study

The current study set out to explore in more detail the relationship between chocolate labelling and expectations. As we are in the process of creating a reduced-fat chocolate, which possesses standard 'milk chocolate' sensory properties (Norton et al., 2009; Norton & Fryer, in press), we also assessed the effect that labelling has on subsequent taste experience of standard milk chocolate. Individual differences in participants may explain some of the discrepancies in the literature relating to the effect of labelling on both expectations and the perceived taste of products (Mela, 2001; Pelchat, 1997; Rozin, Levine, & Stoess, 1991; Solheim & Lawless, 1996). Therefore, a number of participant factors (such as gender, BMI, dietary eating style) were recorded to explore the relationship between these and chocolate-related expectations. Finally, participants were asked how much they would consume, how likely they were to buy, and how much they would pay for the product. Over the course of two sessions, participants were given two samples of identical full-fat chocolate accompanied with the different labels: 'Milk Chocolate' and 'Reduced-fat Milk Chocolate'.

It was anticipated that reduced-fat labelling would reduce expectations of product quality. However, the direction of effect of labelling on actual liking was not predicted. The analysis of the relationship between individual differences and expectations was exploratory.

2. Methods

2.1. Design

The study was a within subjects, repeated measures design: participants tasted both samples. The order in which the samples were tasted was counterbalanced for participants between the first and second session. Significant effects of session order (p-values <.05) were not observed for expected liking [F (1, 85) = .508, p = .478] or actual liking [F (1, 85) = .802, p = .373], suggesting that any carryover effects were minimal.

2.2. Participants

Undergraduate and postgraduate students and staff from The University of Birmingham were recruited via a flyer and poster advertising campaign. One hundred signed up, 91 attended the first session, and 87 completed both sessions (63 Female, 24 male); all participants were untrained consumers. The mean participant age was 24.3 years (SD = 9.6), but participants ranged from 18 to 60 years. The mean BMI (kg/m^2) was 22.5 (SD = 3.9), which is classified as normal, but participants ranged from 16.6 (Underweight) to 40.6 (Obesity class III). Of the 87 participants, 63 were British, and 65 said that English was their native language. Sixty four percent of participants said that they eat chocolate three times a week or more. Seventy eight percent of participants said that they were very likely, or quite likely to try a lower-fat version of a food that they have tasted before. Participants received a £10 gift voucher for completing the study.

2.3. Apparatus

Plain white ceramic plates (19 cm diameter) were used to present the chocolate to the participant. Labels, printed in black ink on white laminated paper, were displayed on the plate next to the chocolate. The chocolates were labelled either 'Reduced-fat Milk Chocolate' or 'Milk Chocolate'. The labels also included a random 3-digit code to make it plausible that the label was for experimental use, rather than for the participants benefit (for example 'Sample 276: Reduced-Fat Milk Chocolate' and 'Sample 530: Milk Chocolate'). The labels were printed (CMU Bright Roman, font size 28, centered, black ink) on plain white paper, cut to size (18 × 6 cm), and laminated.

On each testing occasion three squares of supermarket own brand milk chocolate were given to each participant for expected liking, hedonic and sensory rating, and a further square for consumption questions. The squares of chocolate had a mean weight