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Short Communication

Predictive packaging design: Tasting shapes, typefaces, names, and sounds

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ABSTRACT

Many studies have documented that people match a variety of tastes, aromas, and flavours crossmodally to other sensory features, such as abstract shapes, names, and speech sounds. These findings have had a significant impact on how the sensory attributes of product packaging are understood and how they can contribute to product communication and hence enhance brand value. Here, we report on a study designed to assess how rounded vs. angular shapes, typefaces, and names, and high vs. low pitched sounds, can be combined in order to convey information about the taste (sweetness and sourness) of a product. Our results support the view that "sweet" tastes are better expressed by means of rounded shapes, typefaces, and names, and low-pitched sounds, whereas "sour tastes" are better conveyed by means of angular shapes, typefaces, and names, and high-pitched sounds. These results are discussed in light of the literature on crossmodal correspondences and predictive packaging design.

1. Introduction

It is many years now since the packaging of food and beverage products was thought of merely in terms of portion control, not to mention protecting and conserving the product (see Hine, 1995, on the history of product packaging). Nowadays, a key component of innovative packaging design consists of positioning the packaging as a powerful marketing tool in order to more effectively capture the attention of the consumer in the store, communicate with them, and then, ideally, provide the product with a competitive advantage, as compared to the other products that one finds in the marketplace (see Azzi, Battini, Persona, & Sgarbossa, 2012; Rundh, 2005; Rundh, 2009). Just imagine the packaging of a product, composed of the various visual features such as its colour, shape, the graphemes, and the typographic attributes of any text that happens to be present on the label. Not only that but the feel of the packaging, and any sound that it makes when the consumer interacts with it can also help to convey a particular message regarding the likely attributes of the contents (Spence, 2012a; Underwood, 2003). In the present study, we investigated the way in which visual and auditory features related to packaging convey (or at least are associated with) information about the likely taste/flavour of a product (e.g., Piqueras-Fiszman, Velasco, & Spence, 2012).

The idea that the different sensory features of a product's packaging can convey clues about the product's taste/flavour may be explained in terms of the notion of crossmodal correspondences. According to Spence (2011), crossmodal correspondences refer to the tendency to match various attributes and sensory dimensions across different sensory modalities. Various studies have documented the existence of a range of crossmodal correspondences that may be used to convey information about the taste of a product based on other non-gustatory features. For example, crossmodal correspondences have been documented between tastes and other visual and non-visual sensory cues such as colours (Piqueras-Fiszman & Spence, 2011), sounds (e.g., Knöferle & Spence, 2012), shapes (e.g., Deroy & Valentin, 2011; see also Westerman et al., 2012), and even words (or speech sounds; see Deroy & Spence, 2013; Spence, 2012b; Spence & Gallace, 2011; Spence & Ngo, 2012, for reviews).

There is evidence to support the view that the shape of a package can convey meaning about other sensory attributes of its contents (Spence, 2012b). A few years ago, Overbeeke and Peters (1991) and Smets and Overbeeke (1995) conducted several intriguing experiments designed to assess whether different shapes would better match certain tastes and found that people actually associate, for example, particular shapes to different desserts. A

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large and growing number of studies in the field of crossmodal correspondences have now been published and have started to shed some light on how tastes/flavours and shapes are matched crossmodally (see Becker, Van Rompay, Schifferstein, & Galetzka, 2011; Spence, 2012b; Spence & Gallace, 2011). For instance people (consumers) appear to associate rounded shapes with sweet tastes and angular shapes with sour tastes (e.g., Ngo et al., 2013).

In addition to shapes, other visual features may also be associated with tastes, and can thus potentially be used to provide relevant information via product packaging. Take, for instance, typefaces; Ngo, Piqueras-Fiszman, and Spence (2012) have made the suggestion that different typefaces on a product's packaging may also be capable of conveying meaning over and above the actual semantic content of the particular words written in those various typefaces. Thus, it is possible to think about typefaces that convey information about a product's likely sensory qualities and which may influence both brand and product perception (Childers & Jass, 2002; Doyle & Bottomley, 2006). However, to the best of our knowledge, little research has yet been conducted on the question of how typefaces can be mapped onto sensory attributes in other modalities such as taste.

It is important to note that a product's packaging is composed of more than its visual features. Take speech sounds; it has frequently been suggested that certain speech sounds convey meaning. This notion comes under the banner of sound symbolism research (Sapir, 1929; see also Uznadze, 1924; Uznadze, 1927, for early work in the area). Several studies have been conducted to assess how different speech sounds convey information about tastes and other product attributes (Spence, 2011). For instance, it would appear that 'soft' and 'rounded' sounds (as in nonsense words such as bouba or maluma), may be better matched with sweet tastes (see Dichter, 1971; Gallace, Boschin, & Spence, 2011; Spence, 2012b), while the 'sharper' speech sounds found in words such as 'kiki' or 'takete' may be better associated with sour tastes instead (Ngo et al., 2013). It is, then, possible to suggest that by using the existing knowledge of sound symbolism, a company may be able to design brand names that communicate information about the actual taste of their product (see Abel & Glinert, 2008; Klink, 2000; Klink, 2001; Klink, 2003).

The idea that people exhibit a tendency to match certain speech sounds to a variety of basic tastes has also been investigated using non-speech sounds. For example, Crisinel and Spence (2009) highlighted the existence of a variety of crossmodal associations between tastes and pitch; they reported that high-pitched sounds are better associated with sour tastes, whereas low-pitched sounds are more naturally paired with bitter tastes instead. Certain mappings, such as, for example, those between sweet tastes and the pitch of a sound may not, however, be as straightforward as previously thought (see Crisinel & Spence, 2009; Crisinel & Spence, 2010a; Crisinel & Spence, 2010b; see Simner, Cuskley, & Kirby, 2010, for different findings; and Knöferle & Spence, 2012, for a review).

The prior research that has been published to date has primarily tended to examine the effects of varying one attribute of the packaging at a time (e.g., its shape). Thus, there is a need to investigate how the various visual and auditory attributes interact when they are combined in the packaging of a product. Based on the fact that the taste of a product can be expressed by means of the various sensory attributes of a product's packaging, here, we present a study designed to assess how shapes, typefaces, names, and sounds contribute to and interact in conveying information about the likely taste (or at the very least be associated with it) of a hypothetical food product that might be either sweet or sour. Based on the aforementioned studies, it seems reasonable to expect that rounded shapes, typefaces, and names will be better associated to sweetness, while sourness will be associated with angular shapes, typefaces, and names.

2. Methods

2.1. Participants

Thirty-four participants (8 males, M_{age} = 26.1 years, SD_{age} = 6.0, $range_{age}$ = 19–43 years) took part in this study. All of the participants completed a questionnaire that was designed to assess any potential sensory dysfunction (visual or gustatory), and they also signed a standard consent form. The experiment was reviewed and approved by the Central University Research Ethics Committee at the University of Oxford. The experiment lasted for approximately 20 min.

2.2. Apparatus and materials

E-Prime 2.0 software (Psychology Software Tools, Inc.) was used present the stimuli and collect the data. The participants were seated approximately 60 cm in front of a 23″ LED monitor, with a screen resolution of 1920 × 1080 pixels, and a screen refresh rate of 60 Hz.

The auditory stimuli were created using Audacity, a free software package for audio editing and recording (http://www.audacity.sourceforge.net/). The high pitched sound had a frequency of 1100 Hz, while the low pitched sound had a frequency of 70 Hz. The sounds had a duration of 1000 ms, and were presented right before the visual stimuli, at a level of 70 dB, through a pair of Sony MDR-ZX100 stereo headphones. The auditory stimuli were chosen on the basis of previous research demonstrating that sour tastes can be matched to relatively high-pitched sounds, while sweet tastes have been matched to both high and low pitched sounds (see Knöferle & Spence, 2012, for a review). Based on these findings, high and low pitched sounds were included in order to investigate any effect that they might have on participant's sourness and sweetness.

Photoshop CS4 software was used to create the visual stimuli used in the present study. The visual stimuli consisted of various images of product packaging. The designs were created with the aim of conveying information about the taste of a product by means of their shape (angular vs. rounded), typeface (Hollywood Hills – Regular, 53 pt, for the angular typeface, and Swis721 B1kRnd BT – Black, 44 pt for the rounded typeface), and name (angular vs. rounded, namely Clax and Blum, respectively, see Fig. 1). Crossing these factors gave rise to a total of 8 combinations (2 × 2 × 2) of visual stimuli. In addition, plain (i.e., unlabelled) rounded and angular packages were also included in the design but were not included in the data analyses. All of the images (620 × 780 pixels) were set to an equal mean luminance, and presented against a white full-screen background. The images were 18 cm high on the screen.

The various packaging images were created on the basis of previous research suggesting that sour tastes are matched crossmo-

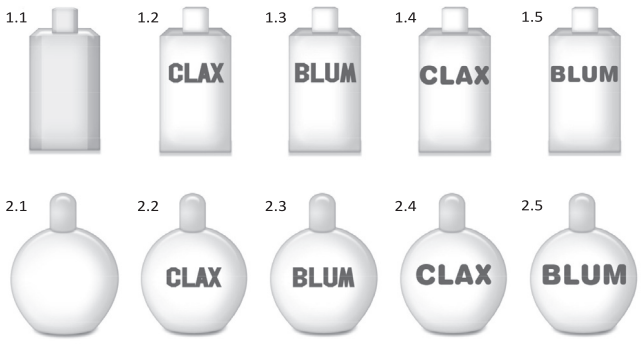

Fig. 1. The 10 examples of product packaging used in the present study.