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## Influence of first position effect on emotional response



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### ABSTRACT

Previous research has demonstrated that overall acceptability of first-tasted product is overvalued. This paper aims to analyse first position effect on emotional response, carrying out two separate studies with different products (chocolate and beer), emotional vocabularies (EsSense profile<sup>®</sup> and consumer-led lexicon) and types of scales (5-point scale and line scale). Our results demonstrate that first position effect is ubiquitous, although it does not affect all emotional terms. An approach to control this effect is also presented. Sensory researchers need to be aware of the influence of first position effect on emotional response elicited by food and beverage consumption.

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### 1. Introduction

Recently there has been growing interest in the study of consumer emotional response, so that research on this topic is now becoming more and more important. Some authors have shown that emotional response measurement provides additional information, beyond overall acceptability (Cardello et al., 2012; Chaya, Pacoud, Ng, Fenton, & Hort, 2015; King & Meiselman, 2010; Ng, Chaya, & Hort, 2013a; Porcherot et al., 2010), and that the emotional process could play a key role, consciously or unconsciously, in the decision-making process (Damasio, 2009).

It seems that emotions are generated by phylogenetically ancient cerebral systems crucial for species survival (Damasio, 2009). An emotion is a brief and intense, physiological and mental reaction, caused by the perception of a relevant stimulus (Clore, Ortony, & Foss, 1987; Ferrarini et al., 2010). Conversely, a mood lasts longer than an emotion and is not focused on a referent (Ferrarini et al., 2010; King & Meiselman, 2010). Moods interact in a dynamic way with perceptual and cognitive processes to impact behaviour (Izard, 2009).

Emotional response can be measured by three main methods: autonomic measure, brain imaging and self-reported measures (Mauss & Robinson, 2009). Autonomic measure, an implicit methodology, is based on physiological reactions (electro-dermal response, heart rate or respiratory frequency), or facial expressions (electromyography or facial recognition software). Brain imaging

(EEG, fMRI), another implicit method, can supply very precise data. These two approaches can be used to measure consumer's unconscious responses, but they are time-consuming, expensive and difficult to interpret.

In the consumer sensory science field, explicit self-reported measures are more advantageous due to their lower cost and length. Self-reported measures can be classified into two categories: visual or verbal techniques. Visual self-reported methods are based on pictures representing various emotions with which consumers express feelings. Some examples are SAM or Self Assessment Manikin (Lang, 1980) and PrEmo (Desmet, Hekkert, & Jacobs, 2000).

In verbal self-reported measures, the subject evaluates his/her feelings using a list of words. Lexicons can be developed for a wide range of products or for a specific product category. Among the former are included EsSense Profile<sup>®</sup> (King & Meiselman, 2010), GEOS and its derivatives (Chrea et al., 2009; Ferdenzi et al., 2011, 2013; Porcherot et al., 2010) and Thomson and Crocker (2013) international lexicon. Product categories that already have their own emotional vocabulary are dark chocolate (Thomson, Crocker, & Marketo, 2010), wine (Ferrarini et al., 2010), blackcurrant squashes (Ng et al., 2013a), fruit salads (Manzocco, Rumignani, & Lagazio, 2013), chocolate and hazelnut spreads (Spinelli, Masi, Dinnella, Zoboli, & Monteleone, 2014), coffee (Bhumiratana, Adhikari, & Chambers, 2014) and beer (Chaya et al., 2015).

Consumers can choose emotions from a list to describe their feelings, i.e., a methodology commonly known as CATA or Check-All-That-Apply approach (King, Meiselman, & Carr, 2013; Ng et al., 2013a; Piqueras-Fiszman & Jaeger, 2014a, 2014b). If deeper

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information is sought, rating scales (Chaya, Pacoud, Ng, Fenton, & Hort, 2015; Desmet & Schifferstein, 2008; King & Meiselman, 2010; King et al., 2013) or linear scales (Chaya et al., 2015; Porcherot et al., 2010) have been commonly employed.

Emotional response and overall acceptability of a product seem to be closely related, and so are frequently studied together. It has been demonstrated that when several products are tested sequentially, overall acceptability of the first-tasted product is overvalued (Macfie, Bratchell, Greenhoff, & Vallis, 1989). Based on that fact, the use of a dummy sample is recommended (Lawless & Heymann, 2010). While the dummy sample is assessed first, its records are discarded from the study (Boutrolle, Delarue, Arranz, Rogeaux, & Köster, 2007; Forde & Delahunty, 2004; Jaeger, Andani, Wakeling, & MacFie, 1998).

Previous literature has identified possible explanations for this first position effect on overall acceptability ratings. One of the most widely held theories is that consumers, normally without any prior training, do not know how to handle the scale correctly (Wakeling & MacFie, 1995). Thus consumers might be using the first sample in order to familiarise themselves with the scale and procedure to be followed (Lange, Rousseau, & Issanchou, 1998). Boutrolle et al. (2007) also suggested that a typical consumer might adopt the dummy sample as a point of reference, comparing subsequent samples with the first. Taking the foregoing into account, it could be more appropriate to measure a single product in each session, when consumers may only make reference to the identity of the product in mind. However, this procedure would entail some practical issues related to cost and session effect.

Beyond these approaches, other factors could also explain first position effect on emotional response. Qiu and Yeung (2008) found evidence that consumer mood could affect the first sample evaluated but not the following samples. Ng, Chaya, and Hort (2013b) studied consumers' response elicited by 11 blackcurrant squash products. These authors questioned if subjects were evaluating the product category in general, in this case blackcurrant squash, or simply focusing on profiling the individual differences across the products. They accordingly proposed the use of a warm-up sample to increase product differentiation.

However, to the authors' knowledge, impact of the first position effect on emotional response has not yet been studied. This work explores the effect, due only to position, on consumer evaluation of the first sample. In addition, the effectiveness of removing the data from the dummy sample is analysed.

## 2. Materials and methods

To achieve research objectives two studies were conducted: on the one hand, Study 1 investigated the first position effect on emotional response to chocolate, applying a Spanish translation of the EsSense Profile® (King & Meiselman, 2010); on the other hand, Study 2 investigated the first position effect on emotional response to beer, applying a consumer-led emotional lexicon (Chaya et al., 2015). It should be noted however that the proposed lexicons may be appropriate to Spanish culture and should not be automatically used in all Spanish-speaking cultures (van Zyl & Meiselman, 2015).

Two different scales were used to measure emotional response: while a 5-point rating scale (1: not at all; 5: extremely) was applied in Study 1, a continuous scale (15 cm line scale) was used in Study 2 (Table 1).

Both chocolate and beer samples were identified by three-digit random codes and tasted blind. Subjects rinsed their mouths before each tasted sample with water and bread sticks provided. Both studies took place at the facilities of the Technical University of Madrid.

**Table 1**

Summary of the studies with details of participants' characteristics, experimental design and main results.

	Study 1	Study 2
Sample size ( <i>n</i> )	84	138
Gender (% male)	48	53
Product category	Milk chocolate	Beer
Number of samples	2 (C1-C2)	Warm up sample (B2) + 4 commercial beer samples (B1-B4)
Dummy sample	50% consumers C1 and 50% consumers C2	B2
Emotional lexicon	EsSense profile®	Consumer-led lexicon
Number of emotions	38 emotion terms	12 emotion categories
Scale	5-points rating scale (1 = 'not at all' to 5 = 'extremely')	Line scale (15 cm)
Number of emotions significantly affected by first position effect	7 out of 38	8 out of 12
Overall acceptability significantly affected by first position effect	Yes	Yes

### 2.1. Material and methods in Study 1

#### 2.1.1. Consumer tests

A first group of consumers ( $n = 84$ , 48% male), aged 18–70 years old, took part in Study 1. Consumers attended one evaluation session (15–20 min) where two different milk chocolates (C1 and C2) were served using a sequential monadic design. Order of presentation was balanced in such a way that each product appeared the same number of times in first position.

#### 2.1.2. Measuring emotional response: EsSense profile®

To investigate consumer emotional response, the lexicon proposed by King and Meiselman (2010) was translated into Spanish by two researchers and a consensus on the final translation was reached after discussion (Table 2). The Spanish list included a total of only 38 emotions, not 39 as in the original list, because the terms *joyful* and *merry* were both translated as *alegre* in Spanish. To check the Spanish translation of the lexicon, a monolingual Spanish native speaker confirmed that the words were familiar to him (Brislin, 1986). Moreover, a back translation was made by two British and Australian bilinguals. After consuming the chocolate samples, participants rated sample overall acceptability (9-point hedonic scale anchored from 'dislike extremely' to 'like extremely') along with participant emotional response (intensity of each emotion term on a 5-point rating scale from 1 = 'not at all' to 5 = 'extremely').

#### 2.1.3. Statistical analysis

A mixed-model ANOVA was applied to the hedonic score (overall acceptability) as well as to the 38 emotions, considering product (C1 or C2) and sample position (1 or 2) as fixed factors and consumer as the random factor. The Least Significant Difference (LSD) test was used to compare each factor's levels. Statistical analyses were performed using the Statgraphics program (Centurion XVI version).

### 2.2. Material and methods in Study 2

#### 2.2.1. Consumer tests

A second group of consumers ( $n = 138$ , 53% male) took part in Study 2. Consumers were required to consume beer at least once a month. Participants attending a single evaluation session (20–30 min) rated their emotional response to four commercial lager-

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