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Influence of evoked contexts on consumers' rejection of two products: Implications for shelf life estimation

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ABSTRACT

Consumers' increasing demand for fresh, safe and high quality products requires food companies to accurately estimate sensory shelf life and tolerance limits for sensory defects. Sensory shelf-life and acceptance limits for sensory defects have been estimated with consumers' rejection data using survival analysis without considering contextual variables, which could have a major influence on consumers' perception. The aim of the present study was to study how consumers' rejection is affected by different evoked contexts in a laboratory setting. Two studies were carried out to study the influence of evoked contexts on consumers' rejection. In the first study consumers' rejection for consumption at home and purchase at a supermarket was compared using orange juice samples with different storage times. In the second study, consumers' rejection for consumption at home and purchase at a supermarket for brands of different familiarities was compared using dulce de leche with different plastic flavour intensities as samples. Consumers' rejection data were analysed using survival analysis. The use of written scenarios to evoke different contexts affected consumers' rejection of products with different storage times and intensities of a sensory defect. Shelf lives that were estimated based on consumers' rejection to purchase were shorter than those estimated considering consumers' rejection to consume. In the second study, consumers' rejection under the consumption at home evoked context was similar to rejection to repeat purchase of a usual brand. However, a large difference existed between the evoked contexts that involved a usual and a new brand. Consumers were harsher when considering to repeat purchase of a new brand compared to their usual brand. These results suggest that the consideration of evoked contexts could contribute to increase the accuracy of sensory shelf life estimation and acceptance limits of sensory defects, leading to more informed business decisions.

1. Introduction

Product quality is a key determinant of consumers' purchase decisions (Stone & Sidel, 2004). Consumers' increasing demand for fresh, safe and high quality products requires food companies to accurately estimate sensory shelf life and tolerance limits for sensory defects (Giménez, Ares, & Ares, 2012; Lawless & Heyman, 2010). Business decisions based on inaccurate shelf life or acceptance limits for sensory defects can have a significant economic impact (Stone & Sidel, 2004). Finding unacceptable products within their shelf-life can decrease consumer confidence in the brand and in the store that sell them, leading them to not purchasing that particular brand again (Harcar & Karakaya, 2005). Besides, retrieving acceptable products from the marketplace is also highly costly (Mena, Adenso-Diaz, & Yurt, 2011).

Sensory shelf-life and acceptance limits for sensory defects have been estimated using consumers' rejection data using survival analysis (Giménez, Ares, & Gámbaro, 2008; Hough, Garrita, & Sánchez, 2004; Hough, Langohr, Gómez, & Curia, 2003). This methodology focuses on the risk of the consumer's rejection of the product, estimating the maximum level of a sensory defect as the level necessary to reach a fixed consumer-rejection percentage (Hough et al., 2003). Traditionally, consumers have been asked whether they would consume the product or not (Hough, 2010), without the consideration of contextual variables. However, context and non-sensory characteristics could have a major influence on consumers' rejection and could affect the estimation of shelf life and acceptance limits of sensory defects.

Food acceptance cannot be understood without consideration of context, i.e. the situational and temporal conditions in which the choice is made (Meiselman, 2006). During their decision-making process, consumers rely on different attributes before deciding whether to buy or consume a certain food product (Ragaert, Verbeke, Devlieghere, & Debevere, 2004). Research has shown that the variables that consumers rely on change depending on the stage of the decision-making process, if it is at purchase, right after purchase or consumption after storage at their homes (Gardial, Clemons, Woodruff, Schumann, & Burns, 1994; Machín, Giménez, Vidal, & Ares, 2014; Onwezen et al., 2012).

Consumer acceptance of food products is strongly affected by non-sensory product characteristics (Köster, 2009; Steptoe, Pollard, &

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Wardle, 1995). According to Jaeger (2006), when making their food-related decisions, consumers have to trade several sensory and non-sensory factors, such as information about the product (brand, price, place of origin), attitudes and beliefs (convenience, health properties), and past experiences. Research has shown that non-sensory product characteristics have a major influence in consumers' perception of the sensory characteristics of products (Bello Acebrón & Calvo Dopico, 2000; Carrillo, Varela, & Fiszman, 2012a, 2012b; Enneking, Neumann, & Henneberg, 2007).

In particular, branding has a major influence on consumers' perceptions, attitudes and behaviour (Ambler, 1997; Davis & Halligan, 2002; Dodds, Monroe, & Grewal, 1991; Rao & Ruekert, 1994). Brand identifies the origin of the product, defines the responsibility of the manufacturer, diminishes risk, diminishes the cost of searching for a product, and consists of a promise, a guarantee or contract with the manufacturer and a symbolic means and sign of quality (Keller, 1998). Several studies have shown that consumers' liking is affected by brand name, being the influence dependent on brand popularity (Di Monaco, Cavella, Di Marzo, & Masi, 2004; Gacula et al., 1996; Guinard, Uotani, & Schlich, 2001; Varela, Ares, Giménez, & Gámbaro, 2010). Therefore, brand could influence consumers' attitude towards sensory defects in a food product.

Despite the fact that studies performed outside laboratory settings have been strongly recommended (Meiselman, 2013), it remains standard practise to conduct research in laboratory settings due to lower cost in terms of money and time (Decker & Trusov, 2010). For this reason, written scenarios have been proposed to evoke contexts during the evaluation of food products under laboratory settings (Hein, Hamid, Jaeger, & Delahunty, 2010). These scenarios instruct consumers to imagine a situation and to think of that situation when evaluating the product. Recent research has shown that evoked context affects consumers' overall liking scores and emotional associations with products (Hein, Hamid, Jaeger, & Delahunty, 2012; Hein et al., 2010; Piqueras-Fiszman & Jaeger, 2014). These results suggest that evoked contexts may contribute to increase the accuracy of estimations of shelf-life and limits of sensory defects.

The aim of the present study was to study how consumers' rejection is affected by different evoked contexts in a laboratory setting. Two studies were carried out to evaluate the influence of evoked contexts on consumers' rejection. In the first study consumers' rejection for consumption at home and purchase at a supermarket were compared using orange juice samples with different storage times. In the second study, consumers' rejection for consumption at home and purchase at a supermarket for brands of different familiarity were compared using dulce de leche with different plastic flavour intensity as samples.

2. Materials and methods

2.1. Orange juice study

2.1.1. Samples

Samples of commercial orange juice aseptically packaged in 1 L TetraBrik® packages from different industrial batches, stored at 25.0 ± 0.5 °C for different storage times (0, 100, 183, 267, 338 and 433 days) were used. Previous studies proved that the industrial process variation for this product was minimal in terms of the juices' physico-chemical and sensory characteristics. No significant differences in acidity and total soluble solids existed between the batches considered in the present study.

Samples (30 mL) were presented in odourless open plastic cups, labelled with three digit random numbers, at 10 °C.

2.1.2. Consumers

One hundred consumers (18–50 years old; 60% female) were recruited among students and workers from Facultad de Química (Montevideo, Uruguay), based on their consumption of orange juice (at least once a week) and interest to participate in the study.

2.1.3. Data collection

Each consumer received the six samples of orange juice in monadic sequence, following an experimental design balanced for order and carry over effects. Consumers were asked to try the juices and to answer 'yes' or 'no' to the two questions: 'Imagine you taste this juice at the supermarket, would you purchase it?' and 'Would you drink this juice if it were stored in your fridge?'.

Testing took place in a sensory laboratory in standard sensory booths that were designed in accordance with ISO 8589 (ISO, 2007), under artificial daylight and temperature control (22 °C). Still mineral water was used for rinsing between samples.

2.2. Dulce de leche study

2.2.1. Samples

Samples of dulce de leche with different plastic flavour intensities were prepared by mixing a fresh commercial sample with different percentages of a polypropylene packaged sample stored at 35 °C for seven months. Six samples were obtained, containing 0, 5, 7.5, 25, 50, and 100% of dulce de leche stored at 35 °C. Plastic flavour intensity was evaluated by a panel of eight trained assessors with a minimum of 18 months of experience in descriptive analysis of dulce de leche, using unstructured scales (0 = nil, 10 = high). Average values are shown in Table 1.

Samples (20 g) were served in closed odourless plastic containers at room temperature, numbered with 3-digit random codes.

2.2.2. Consumers

Sixty consumers who frequently consume dulce de leche (at least once a week) were recruited from the consumer database of the Food Science and Technology Department of Universidad de la República (Uruguay). Participants were aged between 18 and 65 years old and were 62% female.

2.2.3. Data collection

Samples were presented in monadic sequence, following an experimental design balanced for order and carry over effects. Participants were asked to try each of the samples and to answer 'yes' or 'no' to the three following questions: "Imagine you have this dulce de leche stored at home, would you normally consume it?", "Imagine that you have just bought a jar of dulce de leche of the brand you usually buy. You try it and you find this dulce de leche. Would you buy that brand again?", and "Imagine that you have just bought a jar of dulce de leche of a brand you have never tried before. You try it and you find this dulce de leche. Would you buy that brand again?".

Testing took place in a sensory laboratory in standard sensory booths that were designed in accordance with ISO 8589 (ISO, 2007),

Table 1
Average plastic flavour intensity measured by a trained assessors' panel for six dulce de leche samples prepared by mixing a fresh sample with dulce de leche stored in polypropylene containers at 35% for 7 months.

Percentage (m/m) of dulce de leche stored at 35 °C for 7 months with fresh dulce de leche	Average plastic flavour intensity
0	0^{f}
5.0	1.1^{e}
7.5	2.4^{d}
25	5.2^{c}
50	7.9^{b}
100	9.9^{a}

Average values with different superscripts are significantly different ($p < 0.05$) according to Tukey's test.