



Does a time constraint modify results from rating-based conjoint analysis? Case study with orange/pomegranate juice bottles



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ABSTRACT

People do not usually process all the available information on packages for making their food choices and rely on heuristics for making their decisions, particularly when having limited time. However, in most consumer studies encourage participants to invest a lot of time for making their choices. Therefore, imposing a time-constraint in consumer studies may increase their ecological validity. In this context, the aim of the present work was to evaluate the influence of a time-constraint on consumer evaluation of pomegranate/orange juice bottles using rating-based conjoint task. A consumer study with 100 participants was carried out, in which they had to evaluate 16 pomegranate/orange fruit juice bottles, differing in bottle design, front-of-pack nutritional information, nutrition claim and processing claim, and to rate their intention to purchase. Half of the participants evaluated the bottle images without time constraint and the other half had a time-constraint of 3 s for evaluating each image. Eye-movements were recorded during the evaluation. Results showed that time-constraint when evaluating intention to purchase did not largely modify the way in which consumers visually processed bottle images. Regardless of the experimental condition (with or without time constraint), they tended to evaluate the same product characteristics and to give them the same relative importance. However, a trend towards a more superficial evaluation of the bottles that skipped complex information was observed. Regarding the influence of product characteristics on consumer intention to purchase, bottle design was the variable with the largest relative importance in both conditions, overriding the influence of nutritional or processing characteristics, which stresses the importance of graphic design in shaping consumer perception.

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1. Introduction

Decision making is determined by two systems: System 1, which is characterized by intuitive decisions and quick and automatic access to information, and System 2, which is responsible for effortful and rational decisions (Kahneman, 2011). System 1 relies on heuristics, which are simplified strategies that usually ignore part of the available information (less-is-more) to make decisions in a fast way, frugally and more accurately (Gigerenzer & Gaissmaier, 2011). The extent to which the two systems are used for decision making is influenced by individual characteristics, the personal relevance of the decision, mood, as well as situational factors (Bettman, Luce, & Payne, 1998).

One of the situational factors that encourage heuristic processing is time pressure (Samson & Voyer, 2014), which determines the amount of information taken into account during a certain period of time (Ben Zur & Breznitz, 1981). When people have limited time to take decisions,

they tend to change the way in which they acquire information, to ignore important information and to base their decisions on heuristics (De Paola & Gioia, 2016; Gigerenzer & Goldstein, 1996; Rieskamp & Hoffrage, 2008). In this situation, consumers have been reported to make conservative or safer choices in order to avoid potential negative consequences of wrong decisions (Ben Zur & Breznitz, 1981). However, in most experimental research about food choice, consumers are encouraged to invest a lot of time in making their choices and to base their decisions on System 2, which may decrease their ecological validity (Jaeger et al., 2016). For this reason, strategies to encourage intuitive decisions in consumer studies seem necessary to increase their ecological validity.

Feelings of time pressure are increasingly common as modern lifestyle makes people feel that they do not have enough time to do all they want to do in a day (Menzies, 2005). For this reason, imposing a time-constraint in consumer studies can increase the ecological validity of the results. This approach has already been used for evaluating the influence of front-of-pack nutrition labels on food choice (van Herpen & van Trijp, 2011). According to these authors, when consumers were

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asked to complete a choice task under time pressure they decrease their attention to nutrition information.

One of the top trends in the food and beverage market is the intersection of health and convenience. Products that deliver on both health and convenience will proliferate and gain wider distribution as consumers look for easy ways to incorporate more good-for-you products into their lives. Focusing on the fruit juice market, the key trend is the shift from quantity to quality, prompted by consumers' increasing demand for fresh, natural, and premium juices (European Fruit Juice Association - AIJN, 2014). Such demand has motivated the development of new fruit juices with functional and nutraceutical properties (AIJN, 2014). In this sense, pomegranate (*Punica granatum L.*) has extensive global commercial appeal due to its anti-inflammatory, antimicrobial and antioxidant properties (Ferrari, Maresca, & Ciccarone, 2010). In addition, the sugar content of fruit juices has been under scrutiny with regards to their potential contribution to overweight and obesity (van Buul, Tappy, & Brouns, 2014), which has motivated the industry to reduce the amount of sugar they add to their products (AIJN, 2014).

In order to target this specific market niche, innovative technologies such as high hydrostatic pressure (HPP) are increasingly used for producing fruit juice (Romano, Rosenthal, & Deliza, 2015). Although this technology provides safe and fresh products, its novelty makes it necessary to inform consumers about its superiority by including claims on the labels (Sorenson & Henschion, 2011). Abadio-Finco, Deliza, Rosenthal and Silva (2010) reported that information about the advantages of high pressure technology had a positive effect on consumer intention to purchase pineapple juice.

Although food packages can include information about several product benefits, consumers do not usually process all the available information for making their food choices, particularly when making their decisions under time pressure (Varela, Antúñez, Cadena, Giménez, & Ares, 2014; Zellman & Kaye-Blake, 2010). Previous research has shown that label design can override written information, suggesting that it may be an effective strategy to communicate product benefits (Oliveira et al., 2016). In this sense, package and label design has been reported to have a large impact on consumers' perception of food products (Ares et al., 2011; Deliza & MacFie, 1996; Fiszman, Carrillo, & Varela, 2015; Skaczkowski, Durkin, Kashima, & Wakefield, 2016).

Conjoint analysis is one of the methodologies that can be used to study the trade-offs consumers make when forming and overall impression of products (Louviere, 1988). The main principle of this methodology is that purchase intention is determined from the utility that consumers gain from specific product attributes or characteristics. In rating-based conjoint analysis consumers are asked to rate their intention to purchase or liking of a set of stimulus, which enables the estimation of the relative importance of a set of product characteristics on consumers' perception (Moskowitz & Silcher, 2006).

The aim of the present work was to evaluate the influence of a time-constraint on results from a rating-based conjoint task, using pomegranate/orange juice bottles as case study. Considering that visual attention has been reported to be a key factor in consumers' decision making process (Orquin & Mueller Loose, 2013), the influence of time-constraint on how consumers visually process the stimulus during the rating conjoint task was also evaluated to identify changes in information processing.

2. Materials and methods

2.1. Participants

A total of 100 fruit juice consumers (72% female; 18–45 years old) participated in the study. They were recruited among students and workers at the Psychology Faculty (Universidad de la República, Uruguay), according to their interest and availability to participate in the study. All participants self-reported normal or corrected-to-normal vision and full color vision. Participants signed an informed consent

form before starting the test, and received a small gift for their participation.

2.2. Stimuli

Sixteen images of orange/pomegranate juice bottles were designed according to a 2⁴ full factorial experimental design with the following variables: bottle design, front-of-pack nutritional information, nutrition claim, and processing claim. These variables are among the most frequently used to differentiate products in the marketplace (AIJN, 2014). An overview of the variables and levels is shown in Table 1.

Two bottle designs, similar to products of different segments available in the marketplace were selected (Table 1), which were expected to convey different associations to consumers. Front-of-pack information was included using the traffic-light system, as it has been extensively studied in several countries (Hawley et al., 2012). The nutritional composition of the juices was similar to that of commercial fruit juices available in the Uruguayan market and corresponded to high sugar content (calories: 105 Kcal; sugar: 25 g; fat and saturated fat: 0 g; sodium: 1 mg). The nutrition claim was selected considering the antioxidant properties of pomegranate juices (Matthaiou et al., 2014; Mazloum-Ardakani, Salehpour, Heidari, & Zomorodipour, 2013; Mphahlele, Stander, Fawole, & Opara, 2014). Processing claim included the information about the main characteristics of high hydrostatic pressure technology (Sorenson & Henschion, 2011).

Bottles were designed by a professional graphic designer with experience in the design of food packaging. All compulsory information was included on the labels. Bottles did not correspond to products available in the Uruguayan market to avoid any influence of consumers' previous knowledge. Examples of the bottles included in the study are shown in Fig. 1.

2.3. Experimental procedure

Data collection was carried out in a room equipped with a Tobii T60 eye tracker (Tobii Technology, Stockholm, Sweden), under daylight type illumination, controlled temperature (23–24 °C) and airflow conditions. Participants were asked to sit at a distance of 65 cm from the monitor and to move as little as possible during the test. Before starting the task, participants followed a 5-point calibration procedure of Tobii Studio Professional version 2.3 (Tobii Technology, Stockholm, Sweden) with a 1280 × 1024 pixel resolution. Labels were presented monodically following a balanced complete block experimental design (Williams' Latin Square).

Consumers had to look at each of the bottle images, which were presented on a computer screen. They were asked to rate their intention to purchase using a 7-point scale (1 = definitely not, 4 = maybe yes, maybe not, 7 = definitely yes). For each of the images, trials started

Table 1
Description of the variables and levels considered for designing orange/pomegranate juice bottles for conjoint analysis.

Variable	Levels
Bottle design	Traditional Minimalistic
Front-of-pack nutritional information	Absent Traffic-light system
Nutrition claim	Absent "Rich in antioxidants"
Processing claim	Absent "Developed using high hydrostatic pressure, a process that guarantees product quality and safety"

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