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Influence of label design on children's perception of two snack foods: Comparison of rating and choice-based conjoint analysis



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ABSTRACT

The contribution of package design to the marketing of food products targeted at children has increased in the last years, which makes it necessary to study how label design affects children's perception of food products in order to inform policy design and development. Considering that methodological selection is one of the major challenges when conducting research with children, the present work aimed at comparing rating and choice-based conjoint to study the influence of three design variables (cartoon characters, nutrition claims and traffic-light system) on the hedonic reaction of school-aged children towards labels of two popular snack foods: yogurt and sponge cake. A total of 238 children in grades 1–6 from a private primary school in Montevideo (Uruguay) participated in the study. Participants were divided into two groups of similar size who performed either a rating or a choice-based conjoint task. The rating-based conjoint involved the evaluation of 8 labels using a hedonic scale, whereas in the choice task children had to select the label they would like the most from each of 8 pairs of labels. None of the variables was found to significantly affect children's hedonic scores in the rating-based conjoint analysis. On the contrary, choice-based conjoint proved to be easily understood and enabled to discriminate among labels. Results from this approach showed that the inclusion of cartoon characters and nutrition claims positively influenced children's preferences. Implications for research and policy making in label design for children are discussed.

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1. Introduction

Overweight and obesity among children have increased worldwide in the last decades at an alarming rate (Swinburn et al., 2011). One of the causes of this phenomenon is the food environment of industrialized countries, which is characterized by the availability of food that promotes over-consumption of food rich in calories, sugar and saturated fat (Schwartz & Brownell, 2007; Ulijaszek, 2007). In this sense, the contribution of ultra-processed foods, which typically contain high content of sugar, sodium and unhealthy fat, to the total daily calorie intake has markedly increased in the last 10 years in Latin America (Pan American Health Organization, 2015). In particular, Uruguay shows the fastest growth rate in sales of these products in Latin America. There-

fore, food policies aimed at coping with the global children obesity epidemic need to achieve changes in the food environment in order to overcome barriers to healthy eating and promote the consumption of healthful products (Hawkes et al., 2015).

Marketing of unhealthful foods has been identified as one of the characteristics of the food environment which negatively impact children's preferences, purchase behaviour, and dietary patterns (Hastings, McDermott, Angus, Stead, & Thomson, 2006; Institute of Medicine, 2006). Marketing strategies used by food companies to promote their products are not only limited to broadcast and digital advertising, but also include packaging, sponsorship and merchandising (Cairns, Angus, Hastings, & Caraher, 2013; Letona, 2015).

The contribution of package design to the marketing of food products targeted at children has increased in the last years (Hawkes, 2010). Package design plays a major role in attracting attention and influencing purchase intent, and provides food companies the last chance to persuade consumers to buy the product in the point of sale (McDaniel & Baker, 1977; Moskowitz,

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Reiner, Lawlor, & Deliza, 2009). Food products targeted at children have been reported to be marketed using unusual names, unconventional flavour and colours, cartoon characters, photos of celebrities, merchandising tie-ins and direct references to fun and play on the packages (Chacon, Letona, & Barnoya, 2013; Hawkes, 2010; Hebden, King, Kelly, Chapman, & Innes-Hughes, 2011). These marketing strategies encourage children to perceive products as tastier, healthier, more fun and more appropriate for them, increasing their liking and willingness to consume (Elliot, 2009; Lapierre, Vaala, & Linebarger, 2011; Letona, 2015; Letona, Chacon, Roberto, & Barnoya, 2014; Levin & Levin, 2010).

Besides, food companies usually include nutritional information and nutrition claims on the front of pack of products to encourage children and their parents to perceive them as healthful (Castonguay, Kunkel, Wright, & Duff, 2013; Chacon et al., 2013). This information is usually misleading as most products containing nutrition claims cannot be regarded as healthful due to their high sugar, fat and salt content, and their low fibre content (Letona, 2015; Sims, Mikkelsen, Gibson, & Warming, 2011).

The regulation of labelling seems to be one of the possible strategies that can be implemented to encourage children to avoid consumption of unhealthful products (Hawkes, 2010). Another possibility is to include simplified nutrition labels on the front of pack, which can counteract the potential negative effects of the marketing strategies used by food companies on food labels (Privitera, Brown, & Gillespie, 2015). School-aged children have been reported to use nutritional components (sugar, salt, fat and calories) to classify packaged food as healthful or unhealthful (Brierley & Elliott, 2015; Slaughter & Ting, 2010). However, they do not frequently read nutrition information on food labels (Campos, Doxey, & Hammond, 2011), which is perceived as confusing (Neeley & Petricone, 2006). Therefore, it is necessary to develop simplified nutritional information systems. In this sense, research has shown that the traffic light system and emolabels can positively influence children's perception and food choices (Ellis & Ellis, 2007; Privitera, Phillips, Zuraikat, & Paque, 2015).

Research on the influence of label design on children's perception of food products and their relative impact on food choice is still necessary to inform policy design and development (Lobstein, 2013). In particular, one of the areas that deserves further attention is the exploration of the trade offs children make when evaluating all the information included on food packages for making their food choices (Elliott & Brierley, 2012).

One of the major challenges when conducting research with children is selecting methodologies that take into consideration their physical, emotional and cognitive development, particularly in relation with age (Popper & Kroll, 2011). School-aged children have been reported to be able to perform hedonic evaluations using paired preference tests, ranking tasks or hedonic scales (Laureati, Pagliarini, Toschi, & Monteleone, 2015). Therefore, conjoint analysis seems an appropriate methodological choice to study the relative importance of label characteristics on school-aged children's perception of food products perception (Moskowitz & Silcher, 2006).

Conjoint analysis is based on the evaluation of a set of products designed using a combination of levels of attributes following an experimental design (Green & Srinivasan, 1990). There are two main types of conjoint analysis: rating-based conjoint, which is based on consumers' individual evaluation of products using a hedonic or willingness to buy scales, and choice-based conjoint, which relies on the selection of the preferred product among several alternatives (Asioli, Næs, Øvrum, & Almli, 2016). Although choice-based conjoint analysis has been reported to be more similar to real market behaviour than rating-based conjoint, no clear superiority of one approach over the other has been reported (Asioli et al., 2016; Elrod, Louviere, & Davey, 1992; Moore, 2004).

Both approaches have been used with school-aged children. Rating-based conjoint analysis was used with school-aged children by Olsen, Kildegaard, Gabrielsen, Thybo, and Møller (2012) to evaluate the influence of product characteristics on their hedonic perception of juices and buns using computerized pictures. According to the authors, results were reproducible and valid, as the choices performed in the picture-based were in agreement with hedonic evaluations and product choices of actual products. Meanwhile, Jervis, Jervis, Guthrie, and Drake (2014) reported the application of choice-based to study children's preferences for sliced sandwich bread images differing in crust and crumb characteristics. However, to the authors' knowledge no study has compared both approaches with children.

The aim of the present work was to compare rating and choice-based conjoint to study the influence of design variables on the hedonic expectations of school-aged children's hedonic reaction towards labels of two popular snack foods (yogurt and sponge cake). The methodologies were compared across to different age ranges (6–9 and 10–12 years old) to consider differences in children's cognitive development.

2. Materials and methods

2.1. Participants

A total of 239 children in grades 1–6 from a private primary school in Montevideo (Uruguay) participated in the study. The socio-economic level indicators of the neighbourhood in which the school was located corresponded to medium and medium/high income.

Each of the six grades of the school was composed of two classes of approximately 20 students. All the children in each of the classes participated in the study and reported to like the target products. Children were aged between 6 and 12 and were 54% girls (Table 1). Parents and teachers were informed about the study and children's participation was completely voluntary. The study protocol was approved by the Institutional Ethics Committee of the School of Chemistry of Universidad de la República (Uruguay).

Children were distributed into two experimental groups of similar size according to the following procedure. For each grade, all the children in one of the classes completed a rating-based conjoint analysis, whereas all the children in the other class performed a choice-based conjoint task. All children completed the test during the same day. The age and gender distribution of the groups is shown in Table 1. No significant differences in the age and gender distribution of the two groups were found ($p > 0.75$).

2.2. Stimuli

Two popular snack products were used as target products: yogurt and sponge cake. These products are frequently commercialized as appropriate for children in the Uruguayan market. According to the authors' experience, these products are frequently perceived as healthy by Uruguayan children despite having high

Table 1
Age and gender distribution of the total group of children who participated in the study and of the groups who performed rating and choice-based conjoint analysis.

	Total (n = 239)	Rating-based conjoint (n = 120)	Choice-based conjoint (n = 119)
Gender			
Boys	130	67	63
Girls	109	53	56
Age			
6–9 years old	132	67	65
10–12 years old	107	53	54

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