



## The identification of viewing patterns of chocolate snack packages using eye-tracking techniques



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### ABSTRACT

This paper aims at identifying patterns of viewing chocolate snack packages and at exploring how the layout of packaging design elements affects the prospective buyer's visual scanpath in impulse buying. For this purpose, different chocolate snack packages were designed and research participants viewed these for 1.5 s. After analysing the data obtained through an eye-tracking device, two basic viewing patterns were identified. The first was that of first viewing most important packaging design elements from a visual perspective and then moving towards the ones of lesser importance. The second relates to the subject's reading system (in this case, the Western system), with a tendency to prioritise the top left of the packaging. When the packaging design is congruent with both patterns, the effect is amplified and the scanpath of most of the users is predictable. When packaging design does not follow these patterns, the scanpath is less certain; it is, however, mainly determined by the order of element surface size.

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### Introduction

Most product purchase decisions are made directly at the point of sale (POPPI, 2012). For high-involvement products, the buyer has usually decided in advance the type of product he is going to purchase and chooses a specific model at the point of sale. However, for low-involvement products, the buyer has not decided in advance the type of product he is going to buy and often impulse buys.

Once at the point of sale, the buyer is exposed to a multitude of visual lures. Rundh (2005) estimated that an individual may pass up to 300 different brands while touring supermarket shelves, meaning a product has only a split second to spark off purchase (Gelperowic & Beharrell, 1994). Thus, the ability of product packaging to capture the attention of prospective buyers is decisive for increasing the chances of a product being chosen (Chandon, Hutchinson, Bradlow, & Young, 2007).

Impulse buys are unplanned and take place while the subject is shopping, yet not actively searching, for a particular product. In this situation, the time that passes between viewing the product and purchasing it is very short. The buyer responds to his impulses almost immediately, without waiting to gather more information or to compare prices (Jones, Reynolds, Weun, & Beatty, 2003).

Generally impulse buys are a hedonistic temptation through which purchasers seek self-actualization through consumption (Amos, Holmes, & Kenesonc, 2014). This means certain types of products are more likely to be bought on impulse. This is the case for confectionary, which is why this study is based on chocolate snacks. Some 39% of chocolate snack sales in Spain are impulse buys (Cadbury, 2010).

According to Fenko, Schifferstein, and Hekkert (2010), sight is the sense most used during the purchase process; therefore the packaging of a product is a key factor in determining its success in the market. Not surprisingly, designing the packaging is the single most important marketing task for many products (Dickson, 1994). This is because outer appearance is a differentiating element in capturing the attention of prospective consumers (Silayoi & Speece, 2007) and in sparking off product purchase (Bloch, 1995; Tuorila & Pangborn, 1988; Fenko et al., 2010).

Many studies highlight the importance of packaging design. Some investigations analyse the influence of certain packaging attributes, such as colour, shape or label, on consumer expectations of that product (Ares & Deliza, 2010; Puyares, Ares, & Carrau, 2010), as well as on their willingness to buy (Underwood, Klein, & Burke, 2001; Ampuero & Vila, 2006; Rebollar, Lidón, Serrano, Martín, & Fernández, 2012).

Traditionally, studies analysing the influence of product packaging on the consumer use self-reports (Olavarrieta, Hidalgo, Manzur, & Farías, 2012), think-aloud protocols, (Barnett et al., 2011), focus

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groups (Casey & Krueger, 1994), methodologies based on conjoint analysis (Gadioli et al., 2013; Koutsimanis, Getter, Behe, Harte, & Almenar, 2012) or on check-all-that-apply questionnaires (Ng, Chaya, & Hort, 2013), to name a just a few techniques. In these kinds of studies, participants are asked to convey their judgments deduced from a visual stimulus they are presented with, requiring them to interpret their own feelings and to deduce their future behaviour, such as their willingness to buy or try a product. However, visual and behavioural processes are not completely conscious (Bargh, 2002), instead being a psychophysical response (Murray & Delahunty, 2000).

The origin of the problems inherent in conducting these studies lies mainly in individuals' different personal skills – such as judgment or oral expression – and a lack of objectivity in evaluations as a result of interview pressure, meaning some participants may perceive the study to be an exam.

Owing to these problems, some authors have concluded other types of studies are needed to help better understand consumer response to packaging design elements (Silayoi & Speece, 2004).

This paper aims at making a contribution in this direction by using eye-tracking technology to analyse the way in which prospective buyers view chocolate snack packages when impulse buying.

This technique is based on the relationship between human eye movements and visual attention and information acquisition, the latter two both being closely related to higher order cognitive processes (Ares, Mawad, Giménez, & Maiche, 2014).

Furthermore, the use of eye tracking eliminates the problems described above since it does not depend on participants' sensory capabilities, memory and communication. It is able to gather objective data on participants' behaviour in a rapid, less invasive way when they are presented with a visual stimulus (Graham, Orquin, & Visschers, 2012), thus facilitating research into unconscious mechanisms when viewing product packaging.

Several studies on packaging using eye-tracking techniques have been conducted. The primary aim of such studies is to find out what elements or areas on packaging capture user attention. This is determined by analysing the number of fixations on each area, the viewing time, or the time that users take to reach each area. We will now explain how this study relates to earlier ones.

Some papers focus on studying goal-oriented attention (Antúnez et al., 2013; Ares et al., 2013, 2014; Glaholt, Wu, & Reingold, 2010; Piqueras-Fiszman, Velasco, Salgado-Montejo, & Spence, 2013). This technique seeks to find out which packaging elements capture user attention when they are carrying out a specific task, such as deciding how healthy a packaged product is. Other studies focus on examining stimulus-driven attention (Kessel & Ruiter, 2012; Strasser, Tang, Romer, Jepson, & Cappella, 2012). This technique studies the areas on a packaging that capture user attention when they do not have to carry out a specific task, observing stimuli. Finally, other studies (Clement, Kristensen, & Grønhaug, 2013; Orquin & Scholderer, 2011) examine both.

Another characteristic differentiating eye-tracking studies is the time that the stimulus (packaging) is exposed to the user. In some cases, users choose how long the stimulus is present and are able to change it at will (Ares et al., 2013; Ares, Mawad, Giménez, & Maiche, 2014). However, in other studies, the stimulus is shown for a set time, which varies from short periods, such as 2.5 s (Piqueras-Fiszman et al., 2013) up to 30 s (Strasser et al., 2012).

Our study focuses on chocolate snacks, a product closely associated with impulse buys (Cadbury, 2010; Thornton, Cameron, McNaughton, Worsley, & Crawford, 2012). The best way to analyse the buying process is to conduct a goal-oriented attention study since the subject carrying out the action is doing so on a voluntary basis. However, stimulus-driven attention is the most suitable method to analyse impulse buys since, in this case, the subject has

no intention of making the purchase; instead this occurs as a result of a stimulus. As such, it was more realistic not to reveal in advance the object of the study to the subject. To most effectively simulate this process, the product was presented for a very short time: 1.5 s. Our study, as most earlier ones, was carried out under laboratory conditions, although some (Clement et al., 2013) have been carried out in real life shopping or decision-making conditions.

This article shares the objectives of the ones mentioned earlier in that it aims to find out which areas of packaging capture user attention. However, this investigation does not study the time participants spent viewing each area of the packaging, or the time taken to reach these areas, but the order in which the different areas of the packaging were viewed, an aspect that has not been covered in earlier studies. It has been proven (Orquin & Mueller Loose, 2013) that the elements in a list placed at the left or top are more effective in capturing user attention than those placed at the bottom or the right. However, this type of result is based on the reading of texts, lists or web pages, but not on product packaging, where the distribution of elements is very different. Likewise, elements with greater visual salience are most effective in capturing user attention.

The aim of this paper is to understand all the processes involved in the capturing of user attention when viewing impulse purchase packaging and thus to achieve the following specific objectives:

- Identify the existence of packaging viewing patterns of chocolate snacks purchased through impulse buying.
- Determine how the position of the design elements on a chocolate snack packaging influences the scanpath of a prospective buyer in impulse buying.

Analysing the results obtained will help designers of chocolate snack packaging to create layouts that facilitate viewing since they will be congruent with the viewing patterns identified.

## Materials and methods

### Participants

This investigation, conducted in the city of Zaragoza (Spain), was carried out through two experiments. In Experiment I, 127 volunteers participated, for four participants no eye tracking data could be acquired, thus finally there were 123 valid participants of which 52% were male and 48% were female. They had a mean age of 30.5 years, with a standard deviation of 12.1 years. Experiment II involved 95 volunteers; no eye tracking data could be acquired for two of these participants, as such they were excluded from the analysis, resulting in 93 datasets. In Experiment II, 49.5% of participants were male and 50.5% female, with a mean age of 31.4 years and a standard deviation of 13.2 years. Participants in both experiments were recruited from students and staff at the University of Zaragoza who showed interest in participating in the study.

Test participants had normal vision or vision corrected by wearing glasses or contact lenses. Participants with other sight impairments, such as cataracts, were excluded to ensure the eye-tracking device worked correctly.

## Procedure

### Packaging design

Two packagings were designed for this research project. In Experiment I, a rectangular-shaped pack of chocolate chip biscuits was designed with three distinct design elements on the layout (Fig. 1).

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