



## Do prominent warnings make packaging less attractive?

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### ABSTRACT

Despite the importance of packaging attractiveness in product perception, limited research was done on the possible effects of warning messages on the packaging's visual appeal. Our study investigated the attractiveness of the packaging with prominent and non-prominent warning pictograms. Before this, prominent design properties (i.e. large size and thick lines), which make pictograms highly noticeable, were identified by eye-tracking measurements. The packaging samples were designed especially for the purpose of the study. The results showed that large and thick pictograms were noticed more quickly than small and thin pictograms, and this did not affect people's perception of the packaging's attractiveness. Our findings encourage manufacturers to use highly noticeable pictograms in order to increase the likelihood of being detected more easily by the users. This is an important step closer to proper handling of the product.

### 1. Introduction

Besides its primary function of protecting the product, packaging also serves as a communication medium between the manufacturers and the users. Among other information, it can deliver instructions for use and warnings (Hammond, 2011; Laughery et al., 1991; Stewart and Martin, 1994). Some of the most important warnings are those related to the safe use of a product. Safety information can be presented in the form of a pictogram or text, or any combination thereof. There are several valid reasons for using pictograms on product packaging. Firstly, pictograms can facilitate warning comprehension. This is crucial for users who cannot read or might not understand the language on the packaging label (Wogalter et al., 2002). Secondly, pictograms are compact visual forms. They can convey the same amount of information as text (or an even greater amount) while taking up less display area. Thus, in the case of limited packaging surface, they are considered to be more efficient than text (Bruyas et al., 1998). Another reason for their frequent use on packaging is their legibility. Assuming that they are simplified enough, pictograms can be recognised more quickly than the equivalent textual information (Edworthy and Adams, 1996), which is especially relevant when viewing a packaging at-a-glance before the use of the product.

These safety messages have a potential to indirectly protect users from negative consequences which, in some cases, can be even life threatening. Many accidents may have been prevented if users had viewed the on-product warnings (Zuckerman and Chaiken, 1998). That

is why warning labels should be conspicuous and legible (Ayres et al., 1989). Without clearly printed information which the audience can easily process, packaging does not fulfil its communication role, and in so fails in protecting users through its graphic design. In this light, special interest should be given to the prominence of the warnings, mainly because of its crucial role in the process of communicating safety messages (Wogalter et al., 2002). The starting point for this idea of the necessity of noticeability in efficient warning systems is the three-stage model offered by Laughery and Wogalter (2014). According to this model, the effectiveness of warnings is based on three stages that depend on each other. The stages are: noticing (the detection of warning), understanding (the interpretation of the meaning of the warning), and complying (behaving in accordance with the warning). The efficacy of one stage affects the following one. Thus, noticeability is the first, and a prerequisite, requirement that a pictogram should fulfil in order to open the possibility of the continuation of valid safety communication (Wogalter et al., 2002). For the purposes of this paper, we focused our attention only on the first stage (i.e. the noticing).

When it comes to the factors influencing the noticeability of the warnings, previous studies suggest that size and thickness are some of the design features which make the information more prominent. For example, Barlow and Wogalter (1991a) investigated the effects of conspicuous warnings in print ads. The results showed that larger and bold designs increased the likelihood of the viewer seeing the warnings. This was in line with other studies focused on cigarette packages that reported on enhancing the noticeability of warnings by increasing their

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size (Hammond et al., 2007; Nilsson, 1999). Thereby, one of the purposes of our study was to investigate how the characteristics of the safety pictogram (such as its size and thickness) can make it more prominent on the packaging.

As noted by Chen et al. (2015), the effectiveness of a warning may depend on various characteristics, including the warning itself. Manufacturers often rely on national and international legislation that provide optional guidelines for designing effective warning labels (for example EN 15494:2007 Candles - Product safety labels, 2007; International Association for Soaps Detergents and Maintenance Products, 2014). However, in many cases they have their own opinion on how relevant information should be designed and positioned on the packaging, so the best possible aesthetic appearance can be achieved. This is not surprising due to the significant role of packaging attractiveness in brand presentation (Parhizgar and Rostami, 2014) and the manufacturers' sale success. A growing body of research demonstrates the impact of packaging appearance on potential buyers (Littel and Orth, 2013; Machiels and Karnal, 2016; Magnier and Schoormans, 2015; Orth et al., 2010). According to some reported results, appealing packaging can drive the buyers' choice (Reimann et al., 2010; Van der Laan et al., 2012) and affect the perception of product quality (Delgado et al., 2013; Magnier et al., 2016; Wang, 2013). Manufacturers tend to give priority to the decorative role of packaging. Their packaging designers use embellishments and enhancements to attract the consumers' attention (Hurley et al., 2016). In their endeavours to achieve exclusivity and an aesthetically pleasing appearance of the packaging, manufacturers often reduce the area available for the application of safety pictograms. Furthermore, their decisions regarding the position of the pictograms is in many instances guided by the tendency to point up positive characteristics of the product by presenting them on the most noticeable parts of the packaging. It is reasonable that manufacturers and designers are keen on highlighting those elements on the packaging which make it attractive at the point of sale. However, in doing so, they should not degrade the importance of visual cues on the packaging that may prevent the misuse of the product. That is why we were especially interested in the problem of refraining from salient positioning of safety messages due to the potential decrease in visual attractiveness. In particular, our aim was to examine whether prominent pictograms affect the users' perception of packaging attractiveness.

## 2. Hypotheses

Our choice of the dependent variables was driven by our literature review. The authors from the field of human factors and consumer safety suggest that noticeability is a necessary attribute of a safety message (Laughery and Wogalter, 2014; Wogalter et al., 2002), while the researchers in the field of packaging design emphasize that the attractiveness of the packaging can be an important factor in affecting the perception of the product and the drive to buy a product (Reimann et al., 2010; Van der Laan et al., 2012). Reports about the impact of these two variables guided our research.

When speaking of noticeability, it should be noted that prominent pictograms are considered to be more noticeable. Thus, we use the term

noticeability to describe the eye-catching power of prominent pictograms. Noticeability is often referred to as the extent in which pictograms attract visual attention more than other stimuli in the surrounding (Wogalter et al., 2002). Only a small number of studies focused on the noticeability of warnings as a main dependent measure. Most researchers gathered the data indirectly by using self-reports from the participants. For example, Kaskutas and Greenfield (1991) used telephone interview data collections to investigate whether or not people saw the warnings on packaging. They asked respondents if they had seen any warning labels on bottles of alcoholic drinks. Another example is a study of glue product warnings, where Barlow and Wogalter (1991b) also used self-reports including answers to the question: "How likely would it be that you would notice the warning?". However, it is not recommended to use this method as a measure of pure attention (Young and Lovvoll, 1999). In order to get more directly measured and precise data about visual attention, some authors suggest the use of eye tracking technology (Franken et al., 2014; Smith-Jackson and Wogalter, 2006). Researchers who carried out eye tracking experiments reported on the variety of measures of visual attention, of which those concerning the noticeability of warning, in most cases, refer to the time needed to notice a warning (Laughery and Young, 1991; Laughery et al., 1993).

By connecting the measures of noticeability with the attributes of prominent warnings, our first hypothesis was formulated.

**H1.** Large and thick pictogram takes less time to be noticed than small and thin pictogram.

The second part of our research was focused on attractiveness. Perceived attractiveness can affect the users' evaluation of design (Giese et al., 2014). In our study, attractiveness was defined as the extent to which the visual appearance of the packaging is appealing to viewers. Considering that visual appeal of the packaging can affect buying intention (Magnier and Schoormans, 2015), it is not surprising that a great amount of research have focused on the potential moderators of packaging attractiveness. For example, it was found that the use of the golden ratio (Salahshoor and Mojarrad, 2012) and lighter typography (Karnal et al., 2016) can enhance the attractiveness of packaging, while the opposite effect can be produced by transparency (Vilnai-Yavetz and Koren, 2013) or complexity of the design (Orth and Crouch, 2014). The problem arises when the manufacturers' goal to ensure the attractiveness of the packaging becomes dominant over the safety requirements that the packaging should fulfil. In some cases, this may result in a visually appealing package design with insufficiently prominent safety signs. Most of the packaging signs are only noticeable upon closer inspection (Dolić et al., 2013). Fig. 1 shows some of these examples from everyday life. In many cases the symbols are reproduced in extremely small dimensions with degraded visibility, pictorials with very thin lines that are difficult to interpret, warnings on the bottom of containers or other less accessible positions to which users rarely direct their attention. The frequency of these examples encouraged us to assume that the perception of attractiveness could be affected by prominent pictograms, so the second hypothesis was formulated.



Fig. 1. Some of the examples of non-prominent pictograms on packaging (described from left to right): on the back side of the label seen only if peeled off; covered by decorative band; on transparent label placed on the bottom of the box.

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