

The Impact of Packaging Design on Health Product Perceptions

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Packaging design has been studied in a variety of contexts but findings remain inconsistent, particularly on the impact of individual elements (e.g. Mitchell & Papvassiliou, 1999; Becker, Rompay, Schifferstein and Galetzka, 2011; Silayoi & Speece, 2007). Although several studies have found visual cues (picture, typography, colour) to be the most impactful on consumer attention and attitude (e.g. Folkes & Matta, 2004; Silayoi & Speece, 2004), most studies have focused on other elements such as size and shape, (e.g. Ares & Deliza, 2010) and verbal cues (e.g. Klimchuk & Krasovec, 2013). Responding to recent calls for more research (Orth, Campana & Malkewitz 2010), this study investigates the impact of both visual elements and verbal elements on consumer perceptions, specifically looking at product 'healthiness'. To date, there is relatively little research looking at health product perceptions in the marketing literature, despite recognition that health is 'the most significant trend and innovation driver in the global and foods drink market' (Meziane, 2007). This paper applies conjoint analysis to examine the relative importance of four product attributes representing visual and verbal cues: level of information provided on the label (low vs high); presence of an organic 'kite' mark (yes/no); colour (green/orange) and the product image on the label (transparent window vs product photo). It is worth noting that despite being widely found on health food packaging, transparent windows have been considered in only one paper to date (Sioutis, 2011). Three product categories were tested (baby food, soup and coffee) across 288 UK participants. The results find verbal cues to be most important, with the amount of information provided being the key driver.

Key words: food packaging, conjoint analysis, consumer behaviour

JEL classification: M31.

1. Introduction

Although packaging design has been widely studied in the context of general product perceptions, there are relatively few studies addressing perceptions around healthiness. This is somewhat surprising as health has been a dominant trend in Western nations, affecting the food and beverage industry through the re-formulation and introduction of new healthier style products in many categories. UK market research found that over 80% of consumer claim to follow a 'healthy' diet (Leatherhead Food Research Institute, 2012). Consumer perceptions of health food products vary widely, and the drivers of these perceptions remain unclear. This study explores the impact of packaging design on consumer perceptions of the healthiness of food products. It considers the relative impact of visual elements of packaging (e.g. pictures, use of colour) vs the written cues (e.g. amount of information, a nutritional kite mark). This is an important area for research; although some studies suggest visual cues to be more effective in attracting consumer attention (Bone and France 2001, Folkes and Matta, 2004; Silayoi, & Speece, 2004), most studies have focused on other elements, such as size, shape, and information provision. (e.g. Ampuero & Vila, 2006; Yan, Sengupta & Wyer 2014; Newman, Turri, Howlett & Stokes 2014). This paper begins with a brief review of the packaging literature, followed by a detailed discussion of the research design and analysis.

2. Literature Review

Purchase situations in the real world, and particularly grocery shopping, are characterized by multiple visual stimuli and buying decisions that are often not fully conscious (Clement, Kristensen & Gronhaug, 2013). While the visual stimuli in advertising have been the focus of much research (e.g. Elder and Krishna 2012) the impact of packaging design remains a nascent domain of academic research (Orth & Malkewitz, 2008). In recent years, research focus has included the impact of package shape (e.g. Clement,

Kristensen & Gronhaug, 2013; Garber Jr., Hyatt & Boya, 2009; Westerman et al., 2012), colour (e.g. Kauppinen-Raisanen & Luomala, 2010; Labrecque & Milne, 2012; Gordon, Finlay & Watts, 1994), imagery (e.g. Ampuero and Vila, 2006; Underwood, Klein & Burke, 2001), typography (Baik et al., 2011; Celhay, Boysselle & Cohen 2015), and graphics (Bone and France, 2001). Product categories considered include (among many others): milk desserts (Ares & Deliza 2010), Thai convenience foods (Sillayoi and Speece 2004), OTC medical products (e Schoorman & Robben), yoghurt (Becker et al 2011), wine (Boudreaux and Palmer 2007), and water (Ngo, Piqueras-Fiszman & Spence 2012).

2.1 Package Design and Healthiness Perceptions

That information on nutritional content can influence consumer expectations and beliefs about the healthiness of the product is now well established (e.g. Aaron, Mela & Evans 1994; Kahkonen, Tuorila & Rita 1996, Kozup Creyer and, Burton, 2003, Chandon, 2013). There have been a number of studies that have investigated relative placement of the information and depth of detail (Graham, Orquin & Visschers 2012, Sorensen & Clement 2012). What is less clear is the role of other packaging design elements such as colour, imagery, and shape on consumer's health perceptions. A review of the literature identifies only a few studies. Bone & France (2001) find visual elements (imagery, colour) influence consumer perceptions of caffeine content in colas. Baik, Suk and Suh (2011) applied conjoint analysis to determine the relative importance weights of the product name, typography, colour and imagery (photo vs illustration) for an organic Korean food. They find typography to be the most important factor in appealing to consumer's eco-sensibilities and influencing purchase propensity. In a four country survey of > 8000 current and former smokers, Muttie et al. (2011) revealed that one fifth of smokers believed incorrectly that some cigarette brands could be less harmful' than others, with colour of the labelling influenced perceptions of relative risk (gold, silver, blue & purple were perceived as less harmful than red or black), as well as the label verbage ('light/mild' and 'slim' were considered less harmful than 'regular'). Conversely, Fenko, Backhaus & van Hoof (2015) found that manipulating the perceived healthiness of soy products (through design and information) did not influence attitudes. Schuldt (2013) found that products with green labels were perceived as healthier than other colours, despite the fact that all the labels conveyed the same information. Soutis (2011) found shape and the ability to view the product (through a clear window) influenced health perceptions for cereal and juice products. To date, there is no consensus in the literature as to which attributes are most influential on health perceptions. This research attempts to address this gap, looking at the relative impact of visual (colour, imagery) and informational cues (amount of information, kite mark) to consumer perceptions of the healthiness of food products. In the next section we discuss the methodological approach and selected attributes.

3. Methodology

This study uses conjoint analysis to examine the relative importance weights for the packaging elements above. Conjoint analysis has been widely used marketing to evaluate consumer preferences for products and services (Hair et al., 2006) and is frequently applied in examining preferences for food product attributes (Ares and Deliza, 2010; Sillayoi and Speece, 2007; Underwood and Klein, 2002). The necessary data to carry out conjoint analysis consists of consumer evaluations of alternative package designs.

3.1 Establishing the attributes

A review of the literature indicates that size, shape, colour, graphics (i.e. imagery), and product information are the main packaging elements potentially affecting consumer purchase decisions (e.g. Ares & Deliza, 2010). As size is strongly dependent on situation and consumer demographics, and shape has received substantive research attention (see Garber, Hyatt & Boya (2009) for a review), we restrict our attention to colour, imagery and product labelling information. Two levels are developed each product attribute. Although more variables could be considered, most discussion of conjoint methodology emphasizes the importance of balancing the number of attributes required to represent the product against the need to simplify the representation so that it does overly complicate the respondents ranking task (e.g. Green and Krieger, 1991).

3.2 Colour

Although past research recognizes that colour is an influential design element, empirical studies with marketing implications are relatively few. Several studies, (Kauppinen-Raisanen and Luomal, 2010; Grossman & Wisenblit, 1999) find that warm colours (red, yellow) attract attention better than cool colours (green, blue) and that colours influence product associations (see Pantin-Sohier, 2009 for a review). Green is often used in packaging when stressing a healthy, organic or ecological product (Klimchuk & Krasovec, 2013; Schuldt, 2013). Dark colours are more likely to be associated with a more expensive and/or more effective products than light colours (Ampuero and Vila 2006). Based on this, the two selected colour levels for the study are green and orange.

3.3 Imagery

Product images on packaging have been associated with greater product differentiation (Underwood, Klein & Burke 2001; Ampuero and Vila, 2006). In an experimental study, Labbe, Pineau & Martin (2012) find packaging imagery influenced perceptions of product 'naturalness'. Baik et al., (2011) found product photos on packaging to be more associated with organic attributes than illustrations. Ampuero & Vila (2006) find that product photos were more often used with 'safe' or upper-class' products. Although several studies have focused on the distinctions between illustrations and photos (Underwood & Klein 2002, Underwood, Klein & Burke 2001), we found only one paper that addressed transparent windows (Soutis 2011), despite their widespread use on health food packaging. For the current study, the product label will be presented as either a product illustration or a transparent window.

3.4 Information

As cited earlier, the large literature on product information in food packaging is testament to its impact on consumer perceptions (see Hieke and Taylor, 2012 or Hershey et al., 2013 for a review). Studies have looked at relative placement of information (Rettie and Brewer 2000.), and particularly the impact of varying amounts of product information on the packaging (Silayoi and Speece, 2004). Several studies have found that too much information on packaging negatively impacts consumer response and beliefs (Meyvis & Janiszewski 2002). For this study, two levels of information were provided (high/low).

Product labelling with certification logos (such as organic or free trade) is a widely used tool for signalling consumers, but perceptions are often subjective rather than based on familiarity with the scheme (Janssen and Hamm, 2012). The impact of such logos versus detailed nutritional information is a matter of ongoing debate (Larceneux, Benoit-Moreau and Renaudin, 2011, Mitchell and Papvassiliou, 1999). The current research addresses this by considering the above information with and without an organic health logo. The attributes and levels are summarized in Table 1.

Attribute	Level 1	Level 2
Organic Logo	None	Present
Information	Low amount	High amount of information
Colour	Warm colour (Orange)	Cold colour (Green)
Imagery	Product illustration	Transparent window

Table 1: Attributes of package design and their levels

Four attributes, each with two levels, gives rise to 16 possible scenarios (2 x 2 x 2 x 2). As it would be tedious for respondents to rank their preferences for so many different products, the Orthoplan subroutine in SPSS was used to produce an orthogonal main effects design, which ensures the absence of multicollinearity between attributes. The eight combinations of attribute level which resulted and were used in the study are shown in Table 2.

Description	Logo	Information	Colour	Image
1	None	High	Green	Transparent window
2	Present	Low	Orange	Transparent window
3	None	High	Orange	Photo image
4	Present	High	Orange	Transparent window
5	None	Low	Orange	Photo image
6	Present	Low	Green	Photo image
7	None	Low	Green	Transparent window
8	Present	High	Green	Photo image

Table 2: Product descriptions

3.5 Presenting the stimuli

In our study, the eight sets of packaging scenarios were simulated into prototypes and presented via an online survey. Three products were selected for the study, baby food, soup, and coffee, based on a pre-test with consumers to identify product categories where healthiness is a reasonable attribute and where a wide range of product offerings exist. The designs were done by the third author of this study, who had experience as a designer. Each respondent saw two product categories. An initial profiling question (family status) determined whether respondents saw the baby food product (n=112) or the soup product (n=176), with all respondents seeing the coffee products (n=288). To simulate the packages in a realistic situation where consumers would be considering multiple items, the eight pictures of each product were presented at the same time. The order of the products (and product categories) was rotated to avoid order bias. Respondents were asked to order the 8 design profiles from the most to the least preferred in terms of healthiness. As each product was selected, it disappeared from the consideration set, and the remaining products were presented for the next choice decision. This ranking method was chosen because it was clear, practical and best echoed a grocery purchasing situation where one product would be selected from many. See Figure 1 for graphical examples of the products with varying attribute levels.

The study collected 288 responses from UK consumers via an online consumer panel. This is well above the minimum recommended 100-200 sample size to obtain reliable results from conjoint analysis (Qeester and Smart, 1998). Most of the respondents were women (59%).



Figure 1: Examples of attribute levels for Baby food (B1-B4), Soup (S1-S4) and Coffee (C1-C4)

4. Results

The conjoint results for the baby food, soup and coffee products given in Tables 3-6 indicate that information plays the most important roles in consumer preferences for all three categories. The relative importance of this attribute is about 40% for baby food and coffee products, and 48% for soup products. The other attributes included in this study were closer to each other. Imagery had a slight edge over the presence of an organic logo or the colour for all three product categories.

Information is the most important attribute. The higher positive utility for a higher level of information indicates that sufficient clear information on the packaging influences consumer preferences. A product photo had the second highest utility scores. A photo was preferred to the transparent window for all product categories. The presence of an organic logo had a positive influence on consumer preferences. Green packaging colour was preferred to orange for all three products, echoing past findings associating green with environmental or 'healthy' products.

Attribute	Level	Utility	Relative importance (%)
Information	High	0.985	40.06
	Low	-0.985	
Imagery	Product Photo	0.2254	20.38
	Transparent window	-0.2254	
Organic Logo	Present	0.5580	20.24
	Not present	-0.5580	
Colour	Green	0.1674	19.33
	Orange	-0.1674	

Table 3 Results of Conjoint Analysis for Baby food products (n=112)

Attribute	Level	Utility	Relative importance (%)
Information	High	1.577	48.78
	Low	-1.577	
Imagery	Product Photo	0.254	19.09
	Transparent window	-0.254	
Organic Logo	Present	0.486	16.30
	Not present	-0.486	
Colour	Green	0.342	15.83
	Orange	-0.342	

Table 4 Results of Conjoint Analysis for Soup products (n=176)

Attribute	Level	Utility	Relative importance (%)
Information	High	1.262	40.09
	Low	-1.262	
Imagery	Product Photo	0.621	21.97
	Transparent window	-0.621	
Organic Logo	Present	0.536	16.30
	Not present	-0.536	
Colour	Green	0.505	19.18
	Orange	-0.505	

Table 5 Results of Conjoint Analysis for Coffee products (n=288)

4.1 Segmenting responses to packaging elements

Using the largest response set (for coffee, n=288), cluster analysis (K means) was performed using the four individual level importance weights. Three (3) clusters were distinct, separating from each other at relatively large distances in the mental space about attribute importance. The three clusters had a clear and meaningful interpretation, and thus were taken to represent three broad segments, characterized by differing emphasis on package attributes in evaluating packaging. Figure 3 shows the pattern of importance across the three segments. Reference to Table 6 shows that the segmentation scheme derived from the cluster analysis is not based on minor differences of opinion. We name these three segments 'Colour influenced', 'Image seeking' and 'Information seeking.'

Information seeking shoppers represented the largest segment, accounting for two-thirds of the sample. They place the greatest weight on the written information on the package (50%) followed by the presence of the organic label (22%) which is also information. The Image seeking group (21% of

respondents) is visually driven – with the product photo (49%) and colour (21%) carrying the greatest weight. The Colour Influenced segment was the smallest (12.5% of sample) with colour the principal driver (43%) and the other factors roughly equivalent in importance.

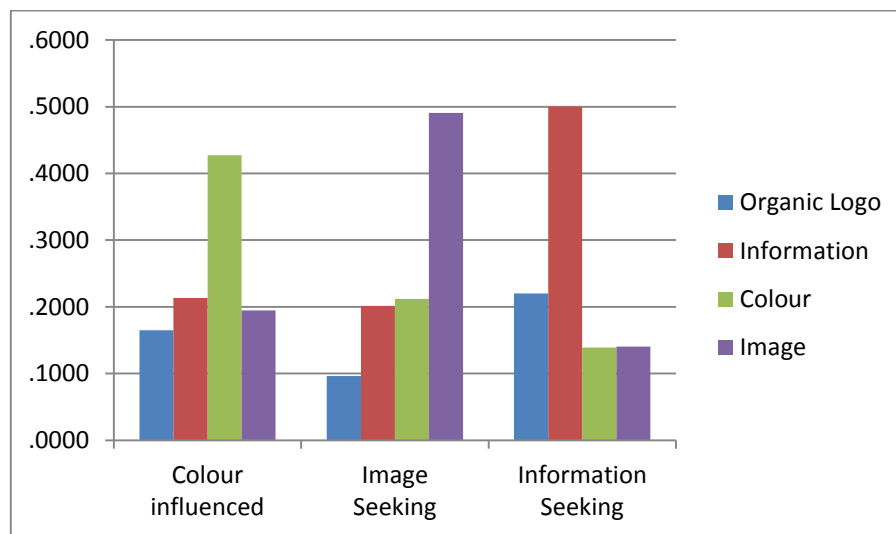


Figure 3 Importance weights in three segments

Level of Attribute	All consumers (n=288)	Colour influenced (n=36)	Image Seeking (n=60)	Information seeking (n=192)	Sig
Organic Logo	.1877	.1647	.0961	.2203	.000
Information	.4024	.2134	.2015	.5001	.000
Green Colour	.1903	.4271	.2117	.1391	.000
Product Photo	.2196	.1948	.4906	.1405	.000

Note: Sig = ANOVA significance of difference between italicised means.

Table 6 Mean of importance on 4 packaging elements by segment

5. Conclusions

The analysis reveals that the amount of information plays the most important role in consumer perceptions of healthiness. Although the value of nutritional labelling has been heavily scrutinised (e.g. Newman et al 2014), this study finds that more text on the packaging is associated with greater healthiness, even when the additional words contains relatively little added health information. For instance, the relative importance of information was 40% for both coffee and baby food, despite the coffee information being fairly neutral ('Full body with Low acidity' 'Balanced, Bold, Clean', 'Coffee protects the liver') while the baby food much more health focused and detailed. This finding suggests consumers use cues (amount of text and relative positioning) to aid decision making and challenges the value of providing detailed nutritional information on front labelling, in line with recent studies highlighting the preference for simple signposting systems, such (see Hawley et al., 2013 for a review). The preference for a product photo rather than a transparent window is an interesting finding, given the current popularity of product windows in packaging. The reason for this preference may be the more visual appeal of the photos, and suggests relationship between aesthetics and healthiness. The relatively impact of the organic logo as a signal for healthiness (16-20%) was surprising, as past studies have suggested that symbols on packaging have more impact than verbal cues (e.g. Carrillo, Fiszman, Lahteenmaki & Varela, 2014). The consumers perceived the green packaging to be more 'healthy' than the orange one. This finding extends past research on the health associations of green, which had focused on red and white as contrasting colours (Schuldt, 2013).

The segmentation analysis suggests that consumers draw on different cues to assess a product's healthfulness. The three segments identified follow patterns seen in other research (e.g. Siloyoi & Speece, 2007). The study has a number of limitations that could be addressed by further research. Only two levels of information provision were tested, yet there are many different degrees and formats for package labelling in the market. We tested the presence of an organic kite mark only; again there is opportunity to explore a

variety of different informational heuristics. Other colours, product categories and package attributes (e.g. shape) should be considered, as well as the relationship with other attitudes, such as willingness-to-pay and propensity to purchase.

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