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## Consumer Behavior: Product Characteristics and Quality Perception

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# **Consumer Behavior: Product Characteristics and Quality Perception**

## **Abstract**

Consumers rely on signals, both extrinsic and intrinsic attributes, to solve their asymmetric information problem regarding product quality. In this study an experiment is designed to evaluate how consumers assess quality perception in terms of specific product characteristics, namely colors and shapes in product labels. According to the cue consistency theory, the prediction is that multiple sources of information are more useful when they provide corroborating information than when they offer disparate conclusions. In this sense, particular colors and shapes combinations which are consistent are expected to enhance consumers' product quality perception, while other combinations that are inconsistent will decrease it.

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## 1. Introduction

Firms spend more money on packaging than on advertising, and packaging is often the most distinguished marketing effort (Dickson, 1994). Labels are one of the most important features of product packaging, and they are designed to communicate a message (Héroux, Laroche & McGown, 1988).

Product labels are sources of information designed to attract consumers' attention, to communicate a message that will motivate consumption. Considerable effort and resources are allocated to product labeling, however, little research exists on how consumers actually process and use the information on the product label. According to Héroux et al. (1988), marketers spend considerable time and money on packaging products in a manner that will attract consumer attention and promote its consumption.

A question that emerges is therefore how consumers perceive product quality from the product label? To answer this question, this paper focuses on colors and shapes in label design as the symbols that convey quality signals to customers on the basis of an experiment conducted among consumers. The emphasis of this study is on the color-shape compositions that are deemed most appealing to consumers, regardless of the reasons for their choices.

Why colors and shapes? Colors have meanings and, as such, they are a fundamental tool in corporate marketing strategies and communications. These underlying meanings are often used for the purpose of product and brand differentiation (Schmitt & Pan, 1994) and also on the basis of consumer perceptions (Grossman & Wisenblit, 1999). Shapes are an essential feature of marketing strategies as well, but little research has been published to date on whether shapes also have meanings of their own or when interacted with colors and how these combinations are perceived as quality signals by consumers.

Interest in how label design can be used as a marketing device stems from ever growing competition in world markets. In this setting, the assessment of quality signals that go beyond the traditional label compositions becomes increasingly important. Previous research shows that labels provide a quality cue that consumers use to assess alternative products with respect to their own values following a set of subjective rules (Hall & Winchester, 2000; Reynolds & Gutman, 1988).

The contribution of this paper is manifold. First, the use of physical features (packaging, labels) as quality signals has not been studied as thoroughly as other signals, as for example brand, price, warranty and store name. Thus the importance of an experiment using colors and shapes combinations in labels to assess consumers' quality perception. Second, little empirical research has been published on the use of color and shape, as well as their associations, in label design. To a certain extent, the absence of published empirical work on these issues is due to competitive concerns (Bellizzi et al., 1983). Further research is nevertheless needed to examine the meaning of color and shape compositions and complementarities on products and brand evaluations. Third, this paper opens up new opportunities for marketing research, especially concerning

experimental design and the use of colors and shapes to extract information on consumer behavior. Experiments can be designed using label colors and shapes in different marketing fields. Finally, this area of research also has direct managerial implications. A better understanding of color and shape compositions can be used as a tool for creating labels that are recognizable and evoke brand and corporate images, thus changing consumers' behavior.

The remainder of the paper is structured as follows: Section 2 presents a summary of the relevant literature. Section 3 discusses the model developed. Section 4 explains the methodology and the experimental design. Section 5 summarizes and concludes.

## **2. Literature Review**

The present study focus is on the impact of labels colors and shapes as signals from the consumer point of view of quality perception, and thus the studies involving consumers' reactions to these quality signals are emphasized in the literature review.

Previous research stresses that packages have an impact on consumers' choice. As a matter of fact, packages are suggested to have great impact as a means of direct communication (Peters, 1994). A package is acknowledged as a marketing communication tool as packages convey meanings directly to consumers when the decision to purchase is being made. As such, it is commonly accepted that packages convey meanings about the product and its features, benefits and usage (Garber et al., 2000; Rothschild, 1987).

Even though the fact that packages convey meanings is well acknowledged, it seems that there are few scholarly studies focusing on packages as a means of communication (Underwood, 2001; Garber, 1995; Gordon et al., 1994). The reason for the few studies on packages may be that marketing communication is traditionally connected with planned activities such as advertising, personal selling, sales promotion, and publicity. However, it can be postulated that the scholarly interest in packages will enhance as it appears that the role of packages as a marketplace phenomenon is changing (Kauppinen, 2001).

### ***2.1. Consumers' Use of Product Quality Signals***

When consumers choose among competing products, they face quality and product performance uncertainty. So, they are likely to rely on heuristics to judge quality across competitive products since consumers have finite time horizons and no incentive to perform thorough comparative studies prior to purchase (Dawar & Parker, 1994).

The economics and marketing literature have both found that signals serve mostly as heuristics in assessing product quality when there is a need to reduce the perceived risk of purchase (Jacoby, Olson, & Haddock, 1971; Olson, 1977), the consumer lacks expertise and thus the ability to assess quality (Rao & Monroe, 1988), consumer involvement is low (Celci & Olson, 1988), objective quality is too complex to assess or the consumer is not in the habit of spending time objectively assessing quality (Allison

& Uhl, 1964; Hoch & Ha, 1986), or there is an information search preference and need for information (Nelson, 1970, 1974, 1978).

The signals that are more studied include brand names (Akerlof, 1970; Darby & Kari, 1973; Olson, 1977; Ross, 1988) or brand advertising (Milgrom & Roberts, 1986), product features or appearance (Nelson, 1970; Olson, 1977), price (Leavitt, 1954; Milgrom & Roberts, 1986; Olson, 1972, 1977; Rao & Monroe, 1989; Wolinsky 1983), and product/retail reputation, store names, warranties, or guarantees (Cooper & Ross, 1985; Emons, 1988; Olson, 1977; Rao & Monroe, 1989).

Although few of the results from these studies can be generalized, brand names have been found to be more important than price, which is in turn more important than physical appearance. Retail reputation or store name has been found to be least consequential in signaling product quality (Jacoby, Szybillo, & Busato-Schach, 1977; Rao & Monroe, 1989). Nevertheless, packages are one of the main elements of the product appearance and as such are an important source of information since consumers rely heavily on labels for product information and also packaging is a significant marketing expenditure larger than advertising itself.

### ***2.1. Consumer reactions to packages***

Several studies have investigated issues such as packages as a means of attracting the attention of consumers (Underwood et al., 2001; Garber et al., 2000; Goldberg et al., 1999; Schoormans & Robben, 1997). Other studies researched packages as a means of communication as well as a means of communicating brand and product meaning (Underwood & Klein, 2002; Garber et al., 2000, Schoormans & Robben, 1997; Gordon et al., 1994; Homer & Gauntt, 1992; Rigaux-Bricmont, 1981; McDaniel & Baker, 1977).

Packages are found to attract attention (Underwood et al., 2001; Garber et al., 2000; Goldberg et al., 1999; Schoormans & Robben, 1997). In fact, Goldberg et al. (1999) found that by dismissing such non-verbal signs as colors, the attention to verbal signs can be increased. Pictures on packages are emphasized to attract attention, particularly when consumers are not very familiar with the brands (Underwood et al., 2001).

Furthermore, packages are claimed to attract attention when their appearances are not typical within a product class (Garber et al., 2000; Schoormans & Robben 1997). In other words, past research has discovered that deviating packages attract attention. Other studies show that deviating package colors and shapes attract attention (Garber et al., 2000; Schoormans & Robben 1997). Underwood et al. (2001), on the other hand, found that pictures on packages attract attention particularly in cases when consumers are less familiar with a brand.

Studies that have focused on other single signs than pictures on packages have found that such single package signs as colors (Gordon et al., 1994), brand names (Rigaux-Bricmont, 1981), and materials (McDaniel & Baker, 1977) convey brand meaning.

Thus, findings concerning past research show that preferences linked to the package

appearance suggest to have an impact on the choice behavior of consumers. This implies that the appearance of the packages has an impact on the formation of the consideration set (Schoormans & Robben, 1997; Garber, 1995) and this claim is supported in a study by Garber et al. (2000).

In terms of the formation of the consideration set Garber et al. (2000) found, on the one hand, that novel package appearances has a positive impact on the formation of the consideration set, particularly when the consumer is looking for variety (Garber et al., 2000). On the other hand, Schoormans and Robben (1997) found that novel package appearances have a positive impact on the formation of the consideration set and on the evaluation of the brands that may be considered, if the deviation of the new packages is moderate.

The importance of communicating the right product and brand values on packages is fundamental, as well as achieving the appropriate level of aesthetics and visual standout. There is generally a need for the package to be distinctive in appearance (Nancarrow et al., 1998).

## ***2. 2. Consumers reactions to colors***

Colors are one of the non-verbal signs that are recognized as an important marketplace phenomenon (Garber et al., 2000; Grimes & Doole, 1998; Gorn et al., 1997; Schoormans & Robben, 1997; Evans et al., 1996; Gordon et al., 1994; Belizzi & Hite, 1992; Danger, 1987; Danger, 1987). Colors' importance is especially recognized when it refers to advertising and packaging (Belizzi et al., 1983). The function of colors to attract attention is emphasized by arguing that colors are the most important visual sign to attract consumers' attention, as it is the first sign that the consumers notices on a package (Danger, 1987; Danger, 1987).

Kojina et al. (1996) found that the colors accepted on packages by consumers may be limited. However, Kojina et al. (1996) also suggest that preferences regarding colors and patterns may have an impact on brand choices. This finding by Kojina et al. (1996) is supported by Gordon et al. (1994), who also found that such package sign as colors have an impact on brand choices.

When it comes to specific signs that attract attention, it can be found that past research suggests that such signs as colors attract attention. Garber et al. (2000) and Schoormans & Robben (1997) found that colors on packages attract the attention of consumers. As a matter of fact, it is postulated that colors are the first sign that the consumer pays attention to on a package (Danger, 1987; Danger, 1987). Previous studies support the idea that colors attract attention particularly when consumers seek for variety in their brand choices (Garber et al., 2000; Schoormans & Robben, 1997).

Gordon et al. (1994) focused their research on the colors of packages. Their results support the suggestion that colors do communicate. Colors were found to be related to the brand as they were found to communicate the quality of the brand. Furthermore, colors were implied to be related to the core product as the study found that colors communicated, for example, such a feature of the product as taste. Their study also

implies that colors have an impact on the behavior of consumers. For example, they discovered that colors have an impact on brand evaluations and on brand choices. So as pointed out, Gordon et al. (1994) support the idea that colors on packages may have an impact on brand evaluation and on brand choices.

### *2.3. Consumers reactions to shapes*

The literature shows that the visual appearance of a product can influence consumer product evaluations and choice in many ways. (Creusen & Schoormans, 2005). Some authors considered the role of product or package appearance in consumer product evaluation or choice (Bloch, 1995; Garber, 1995; Garber et al., 2000; Veryzer, 1993; Veryzer, 1995)

It is found that the shape of products (Bloch, 1995) attracts attention. Kojina et al. (1986) studied the relationship between design and pattern preferences, and design and color preferences. They found that design and pattern preferences were related to each other whereas design and color preferences were not.

Schoormans & Robben (1997) affirm that when consumers seek for variety in their brand choices the shapes of packages are considered as well. These authors confirmed this for package appearances; a slightly atypical appearance catches attention from consumers while remaining acceptable to them. So in general, an appearance that differs slightly from the prototype will be preferred.

There are several ways that product designs influence consumer preference (Bloch, 1995). The design of a product determines consumers' first impression of the product and quickly can communicate product advantage (Creusen & Schoormans, 2005). In addition, the design of a product will generate consumer inferences regarding several product attributes (Berkowitz, 1987; Bloch, 1995)

For food products, the attention-drawing ability of a package has been found to heighten the probability of purchase (Garber, 1995; Garber et al., 2000). Garber (1995) emphasizes that the visual effect of a product package is relative to a background comprised of competitor alternatives. In general, the attention drawing ability of a product can be enhanced by increasing its size and by using bright colors. The preferred shape (e.g., rounded or angular), color, or size were found to differ depending on the way in which product appearance played a role for subjects (Creusen & Schoormans, 2005).

Furthermore, the product or package appearance can reinforce the image of a brand, as the identity of a brand is expressed visually in the appearance of products (Schmitt & Simonson, 1997).

Although there are large individual and time-specific differences in the experience of color and form, there are certain associations that seem to be relatively constant. Overviews of the influence of form and color on consumer perception of symbolic value (and ergonomic and aesthetic value as well) can be found in Muller (2001), Murdoch and Flurscheim (1983), Schmitt and Simonson (1997), and Whitfield and Wiltshire

(1983). For example, angular forms are associated with dynamism and masculinity, while roundness evokes softness and femininity (Schmitt & Simonson, 1997). Also, Creusen and Schoormans (2005) found that subjects in their study liked a rounded product because this looked modern and friendly and that angularity looks old fashioned and cheap.

#### ***2.4. Consumers purchase intention***

It is well accepted that packages have an essential role in influencing the consumer purchase choices and intention at the point of purchase. These past research findings are related to the current study, their findings contribute to the understanding of the impact of packages on consumer behavior and more closely their purchase intention at the point of purchase.

Another finding is that appearances have an impact on attitudes concerning brands and packages as well as purchase intentions. The studies on behavior communication have focused on the impact of the package appearance on various phases in the choice process.

Such issues as the formation of the consideration set (Garber et al., 2000; Schoormans & Robben, 1997), product recall (Rettie & Brewer, 2000), product and brand evaluation (Underwood & Klein 2002; Schoormans & Robben 1997; Homer & Gauntt, 1992; Gordon et al., 1994) and choice behavior (Gordon et al., 1994; Kojina et al., 1986) have been emphasized.

#### ***2.5. Colors and shapes in labels***

The literature is mostly silent on how individuals respond to label shape variations and color compositions. De Mello and Pires Gonçalves (2008) found that there are strong preferences for selected combinations of colors and shapes in the composition design of wine labels.

There is nevertheless a rich body of research on reactions to colors, which can be innate/instinctive (Humphrey, 1976) or learned/associative (Langenbeck, 1913, cited in Hupka *et al.*, 1997). If they are instinctive, color signals trigger affective reactions in the brain. But, if they are learned, preferences over colors are learned over time as shared affective meanings or as result of past experiences and/or conscious associations in language, literature and myths (Osgood *et al.*, 1957).

Colors can be associated with objects on different dimensions. Osgood et al. (1957) shows empirically that there is an association between color and objects at least on the basis of an evaluative scale of preferences. On an activity scale of preferences, the ordering of colors generally follows the hue dimension: “hot” colors, such as red and yellow, lean towards activity, black and white are by and large neutral and “cold” colors, such as green and blue, are closer to the passive end of the spectrum<sup>2</sup>. Colors can also be ordered along a saturation dimension on potency scales: the more saturated the color, the more potent the object being judged is perceived. It appears that the

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<sup>2</sup> See Appendix Figure 1.



evaluative effect of color interacts with the nature of an object, whereas the effects of color upon judged activity and the potency of objects with which they are associated are systematic and consistent with the hue and saturation dimensions, respectively.

Because of its powerful underlying interpretations, color is an important marketing tool, including for the creation of brand images (Madden *et al.*, 2000). There appear to be universal patterns in reactions to colors, which makes it possible to construct international color codes. The country-culture clusters<sup>3</sup> identified by Aslam (2006) are based on language and communication similarities and indicate the meanings and associations of colors in selected clusters.

Reactions to labels are more complex. Labels provide important extrinsic cues (*i.e.*, attributes that are not part of the physical product) to be used by consumers to assess quality (Verdú Jover *et al.*, 2004; Rocchi & Stefani, 2005).

In the next section, the model developed in this research is explained.

### 3. Model

Products constitute an array of intrinsic and extrinsic attributes that consumers use to determine product quality (Miyazaki, Grewal, & Goodstein, 2005). A top priority for marketers is to find out which of the many extrinsic and intrinsic cues consumers use to signal quality (Zeithaml, 1988).

Attributes that signal quality have been categorized into intrinsic and extrinsic cues (Olson, 1977; Olson & Jacoby 1972). Intrinsic cues involve the physical composition of the product. In one hand, intrinsic attributes cannot be changed without altering the nature of the product itself and are consumed as the product is consumed (Olson 1977; Olson & Jacoby 1972). On the other hand, extrinsic cues are product-related but not part of the physical product itself, by definition, they are outside the product.

Which type of cue, intrinsic or extrinsic, is more important in signaling quality to the consumer? Researchers who tackled this question (Darden & Schwinghammer 1985; Etgar & Malhotra 1978; Olson & Jacoby 1972; Rigaux-Bricmont 1982; Szybillo & Jacoby 1974) concluded that intrinsic cues have higher predictive value and were in general more important to consumers in judging quality than extrinsic cues.

However, some studies (e.g. Sawyer, Worthing & Sendak, 1979) have shown that extrinsic cues can be more important to consumers than intrinsic cues. Extrinsic cues are conceived to be used as quality indicators when consumers act without enough information about intrinsic product attributes. This is a rather common situation that occurs when consumers have little or no experience with the product, or when consumers do not have enough time or interest to evaluate the intrinsic attributes, or cannot readily evaluate the intrinsic attributes.

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<sup>3</sup> The country-culture clusters used by Aslam (2006) are adapted from Ronen and Shenkar (1985); see Figure 3 in the Appendix.

A small number of cues, particularly those involving the product's package, are difficult to classify as either intrinsic or extrinsic. Packages can be considered an intrinsic or an extrinsic cue depending on whether the package is part of the physical composition of the product, in which case it would be an intrinsic cue, or protection and promotion for the product, in which case it would be an extrinsic cue. In this research we consider the label in terms of its color and shape composition as extrinsic cues in the package.

The consumer relies on extrinsic attributes such as price, brand, package and warranty, as substitutes for intrinsic product attributes. The most studied extrinsic cue is the relationship between price and perceived quality; almost 100 studies have been published in the past 30 years. (Brucks, Zeithaml, & Naylor, 2000).

Dawar and Parker (1994) observed that brand name and price together are most useful in quality determinations. In their survey, however, brand and price cues were assumed to change together and were not manipulated to offer potentially inconsistent information. Similarly, Brucks et al. (2000) found that when price is matched with a consistent brand cue, it is used significantly more often than when the brand cue is absent. Similarly for other extrinsic cues, Chao (1989) found that the price-quality relationship is enhanced when matched with a positive country of origin brand, and Boulding and Kirmani (1993) found that warranty effects are stronger when matched with information indicating high reputation warrantors.

According to the cue consistency theory (Maheswaran & Chaiken, 1991) multiple sources of information are more useful when they provide corroborating information than when they offer disparate conclusions. In such cases, attitudes are derived by a straightforward integration of their values. That is, when cues are consistent, they are more likely to be used jointly in evaluations that employ information integration models such as linear averaging (Anderson, 1981).

When cues are in agreement, they can be averaged or linearly combined to arrive at product evaluations (Anderson, 1981), but the weighting of each piece of information changes when the values of the cues disagree.

Following the model developed by Zeithaml (1988), relating extrinsic and intrinsic product attributes, perceived quality and purchase intention, a similar model<sup>4</sup> is proposed in which colors and shapes are used as signals of quality perception. Given the focus of this research on consumer perceptions, perceived quality is considered to be the consumer's judgment about a product's overall superiority or excellence (Zeithaml, 1988).

Economic models specify that consumer demand is increasing in quality (Tirole, 1988); at a fixed level of quantity, higher quality yields higher prices. Consumer behavior models also portray quality as a positive antecedent to behavioral or purchase intentions (e.g., Boulding et al., 1993; Dodds, Monroe, & Gerwal, 1991; Zeithaml, 1988).

In this research the prediction is that when the two extrinsic cues, namely, color and shape, are combined in a consistent way on a product label, the overall product quality

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<sup>4</sup> See Appendix Figure 5.

perception is enhanced, and when color and shape are inconsistently matched, product quality perception is weaker.

The research hypotheses below are a new application to the cue consistency theory in the sense that they test two cues, color and shapes that have not being tested jointly so far.

*H1:* There will be an interaction effect of a product characteristic (color and shape) on consumers' quality perception of product quality, such that the effect of either cue will be stronger when paired with a consistent cue.

*H2:* There will be an interaction effect of a product characteristic (color and shape) on consumers' quality perception of product quality, such that the effect of either cue will be weaker when paired with an inconsistent cue.

Therefore, first of all, there is a need to uncover the meanings of colors and shapes, and find out whether or not certain shapes have similar meanings to particular colors. Next an experiment will be designed to uncover the effect of product quality perception using color and shape combinations in product labels.

In the section below, the methodology concerning the assessment of the meanings of colors and shapes is explained, and an experiment design is proposed to test the research hypotheses on experience goods.

## **4. Methodology**

### ***4.1. Meanings of Colors and Shapes***

Cultures differ in their aesthetic expressions as colors represent different meanings and aesthetic appeals in different cultures. This study used data gathered from a survey given to high school students in Spain to assess semantic differentials, for examining the communication values of not only colors, but more specifically of shapes, and their interaction with colors as well.

As in Madden et al. (2000), who studied the meanings of colors, a list of attributes in a semantic differential scale was used<sup>5</sup>, this time not only to elicit the meanings of colors according to the active scale, but above all, to find out whether or not shapes also have meanings as colors do, and whether or not shapes also follow a pattern in the semantic active scale.

Since secondary source data is not available, primary source data had to be gathered. Two separate survey questionnaires were developed for that purpose, as explained below. The sample included twenty high-school students from Montmeló, located in the north of Barcelona. Each student answered both the first and second questionnaires.

Two different questionnaires<sup>6</sup> were developed to gather data:

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<sup>5</sup> See Appendix Figure 2 for the list of attributes in the Semantic Differential Scale.

<sup>6</sup> Actual questionnaires in a separate Appendix.

*Questionnaire 1:* The first questionnaire followed Madden et al. (2000), with three parts. Respondents first rated each of ten colors, namely, black, blue, brown, gold, green, orange, purple, red, white, and yellow<sup>7</sup> with respect to how much they like or dislike each color in a seven-point Likert scale. Next, they rated the ten colors on scales designed to capture the meanings associated with color, the respondents rated each color on twenty items associations, using a seven-point semantic differential Likert scale. Last, to assess potential meaning arising from color combinations, subjects selected a color to place in the top half of separate logos in which the bottom half color is blue, red, or green and the top half is one of the remaining nine colors. Blue, red, and green are used because they are often the most popular colors (Ward, 1995).

*Questionnaire 2:* A second questionnaire was developed, analogous to the first one, where shapes, instead of colors, were assessed. Similarly, in the first part of this questionnaire, respondents rated each of fourteen shapes, namely, square, rectangle, parallelogram, trapeze, diamond, rounded rectangle, octagon, pentagon, isosceles triangle, square triangle, circle, ellipse, hexagon, and cross<sup>8</sup> with respect to how much they like or dislike each shape in a seven-point Likert scale. Next, in the second part of the questionnaire, respondents rated the fourteen shapes on scales designed to capture the meanings associated with shape, they rated each one of the fourteen shapes on exactly the same twenty items associations as in the color questionnaire, using a seven-point semantic differential Likert scale. Last, to assess the potential meaning arising from color and shape combinations, subjects selected among one of the ten colors to place in each one of the fourteen shapes.

Preliminary results<sup>9</sup> show that a coincidence exists between 'hot' colors as red and certain pointed shapes as triangle, pentagon, diamond, etc., and also between 'cold' colors as blue and green with more stable shapes as square and rectangles. Thus, shapes which are more symmetrical and stable as square and rectangle are located towards the passive end of the active scale spectrum, while rounded shapes as circle and ellipse more or less in the middle and shapes with sharp ends as isosceles triangle, diamond and pentagon are located in the more active end of the spectrum.

So with the preliminary data available, as expected, shapes also follow the active scale as colors do, and there is a match between pointed, sharp shapes with hot colors at one end of the scale, and symmetrical, stable shapes with cold colors at the other end of the scale.

Therefore, the research hypotheses proposed above can be tested, since certain shapes have meanings which are similar to some colors, thus allowing the two extrinsic cues, namely color and shape, to be matched in a way that both cues can provide a combination that corroborates each other in a consistent manner, or on the contrary, colors and shapes can be combined in such a way that their combination is inconsistent. For example, red and triangle, blue and rectangle, green and square, are considered to be

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<sup>7</sup> Actual colors used in questionnaires from Microsoft Word.

<sup>8</sup> Actual shapes used in questionnaires from Microsoft Word.

<sup>9</sup> See Appendix Figure 4.

consistent combinations<sup>10</sup>.

## ***4.2. Product Categories: Experience Goods***

Economics of information theory (Nelson, 1970, 1974; Darby & Karni, 1973) classifies products into three categories according to how consumers evaluate the product. This classification was initially developed to help explain the notion that consumer information about quality often has “profound effects upon the market structure of consumer goods” (Nelson, 1970).

Nelson (1970) defined two types of qualities that had distinct characteristics in terms of consumer evaluation processes. Search qualities are those that can be fully evaluated prior to purchase. Experience qualities are those that must be first purchased and consumed before the consumer is able to evaluate, thus are products which quality can be evaluated only after purchase. Darby and Karni (1973) introduced credence goods to extend the information acquisition classification into a more precise classification. Credence qualities are those that the consumer can never evaluate completely, even after purchase and consumption, i.e. those accepted on faith.

Signaling is most useful for products which quality is unknown before purchase, such as experience goods. Thus, signaling may not be appropriate for search products, well known or mature products, or consumer markets with highly familiar buyers. Signaling may be particularly effective in markets for relatively new products or products about which consumers are relatively uninformed but are quality sensitive. Therefore, signals are unlikely to convey quality for credence products, which quality is not discernible even after purchase and use (Darby & Kami, 1973).

In brief, signaling is most effective under conditions in which pre-purchase information about quality is limited, and post-purchase information about quality is not ambiguous, i.e. experience goods.

Hence for the purpose of this research, experience goods will be included in the experiment design to assess how colors and shapes are used as signals by consumers in terms of their quality perception. A few examples<sup>11</sup> for such experience goods are: education, jobs, hotels, vacations, transportation, sport clubs, newspapers, music records, movies, restaurants, food and beverages. Among the food group, beverages is the category chosen for the experiment designed below because they are more practical products to be used in a lab experiment setting.

## ***4.3. Experiment***

### ***4.3.1. Foreword***

Although simplified when compared with the real world, laboratory experiments are nonetheless “real processes in the sense that real people participate for real and substantial profits and follow real rules in doing so” (Plott, 1987).

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<sup>10</sup> See Appendix Figure 6 and 7.

<sup>11</sup> Nelson (1974); Liebermann & Flint-Goor (1996).

Louviere et al. (1999) concluded that contrary to popular wisdom in behavioral-decision making and related research areas, consumers seem to have fundamental preferences and values that can be revealed by a variety of forms of preference measures and tasks.

Discrete choice experiments are commonly used to study consumer preferences in marketing, transportation and applied economics. These discrete choice experiments allow researchers to estimate the effects of attributes on preferences and to test hypotheses about preference processes. A discrete choice experiment usually consists of a set of designed choice scenarios that describe alternative products, and subjects are asked to state their most preferred option in each set. Products are described by a combination of attributes and levels assigned by researchers on the basis of an experimental design (Louviere et al., 2008).

While information on potentially relevant product attributes and levels can be obtained from focus groups, surveys and experiments, researchers still face the important decision of choosing an experimental design. According to Louviere et al. (2008) the consistency with which consumers answer choice questions is related to the accuracy with which demand can be predicted.

Swait and Adamowicz (2001a, 2001b) and DeShazo and Fermo (2002) showed that respondents answered choice questions less consistently in more complex discrete choice experiments tasks. Experimental economists attempt to obtain control over as many variables as possible in order to exclude the effects of disturbing factors. The greater the control achieved in this way, the better the experimental design and the less ambiguous the experimental results (Siakantaris, 2000).

#### *4.3.2. Experiment Design*

Therefore, this experiment is designed to test the research hypotheses predictions proposed above, in a laboratory environment in such a way that the experiment design is accurate and data is reliable. Thus, the experiment's purpose is to collect data to test this study's research hypotheses. The goal is to establish an experiment for the empirical validity of signaling theory to demonstrate that consumers' product quality perception responses to extrinsic cues, namely colors and shapes in product labels, are consistent with the cue consistency theory predictions.

Consequently in the experiment designed forth, the two extrinsic cues, color and shape, will have to be matched so both cues can provide a combination that corroborates each other in a consistent manner, or on the contrary, colors and shapes will have to be combined so that their combination is not consistent.

In this sense, in the experiment, hot colors as red and yellow would have to be matched with shapes as triangles and diamonds since these corroborate each other, and cold colors as blue and green would have to be matched with rectangles and squares, since these are also corroborating combinations. On the other hand, hot colors as red and yellow would have to be matched with shapes as rectangles and squares because these are combinations which are not consistent, and by the same token, cold colors as blue

and green would have to be matched with triangles and diamonds since these are also inconsistent matches. The resulting data from the experiment would enable to further extend the current study.

In order to do so, and to better approximate a real economic processes in the laboratory environment, a market for the products will be created. Participants in the experiment will be separated in two groups, sellers and buyers, and will be placed in two separate rooms. There will be five sellers and ten buyers in each session.

Some experience goods (i.e. beverages: water, wine, orange juice, beer, milk) will be traded between sellers and buyers. A number of five rounds of trading will take place for each one of the five products in a total of twenty five rounds per session.

In every trading round, an actual product will be traded, and as described in the previous section, experience goods, more specifically beverages, will be traded in this experiment. All sellers will receive an actual product to be traded at the start of every trading round, without any label, and then sellers will choose individually and privately a label with a color and shape combination to display on the product. For every actual product traded, the color and shape combination in the product label will be the only information on quality that sellers will give buyers, and will be the only information buyers will have to perceive the product quality.

More specifically, in the experiment there will be only two shapes, namely rectangle and triangle, and each shape can be combined with only two colors, namely blue and red. In total, there will be four color and shape combinations of labels to be displayed on the actual product by the seller. Two combinations are consistent: one with a hot color and a hot shape (red triangle), and the other one with a cold color and a cold shape (blue rectangle). Two combinations are inconsistent: one with a hot color and a cold shape (red rectangle), and the other one with a cold color and a hot shape (blue triangle).

In the first treatment, buyers will not know the choice from other buyers, and sellers will not know the choice from other sellers. Sellers will make their choices individually and privately in one room, only one color and shape combination per round. Once sellers are done with their selling choices, then buyers will be shown, individually and privately, the five products available to be sold. In the other room the buyers will see the actual products with the five color and shape combinations in labels chosen by the sellers which are available for them to buy in every round. Buyers will then individually and privately rank all five color and shape combination from one to five, one being their first choice, and five being their last choice.

After all ten buyers make their decision, the trading round is over and then the experimenters will match buyers and sellers according to their choices. The only information each seller will receive individually and privately after each trading round is how many buyers decided to buy what they offered to sell. That means, how many of the ten buyers chose the color and shape combination the seller offered to sell as their first choice to buy. So, a seller will get a point for each buyer that chooses the color and shape combination that the seller wanted to sell. For each match between buyers and sellers, sellers will earn a point which by the end of the experiment will be translated

into money; each point is worth forty cents of a Euro.

A second trading round then starts. In the next trading round, the same product will be traded between sellers and buyers, and participants can again make their choices, they can either repeat their previous choice or change it. Once again, sellers make their selling choices individually and privately in one room, labels are displayed on the products, and the five available color shape combinations for selling are then disclosed for buyers in the other room. Buyers will then once more individually and privately rank all five color and shape combination from one to five, one being their first choice, and five being their last choice. The same procedure as in the first round is then repeated to match sellers and buyers, and sellers earn a point for each buyer that chose the color and shape combination the seller offered to sell.

For each product five trading rounds will take place, then after the five rounds are over, another product will be traded in the exact same manner. All five products will be traded in five rounds, in a total of twenty five rounds. The maximum amount a seller can receive after all twenty five trading rounds are twenty Euros, the minimum is zero Euros.

As for the buyers, at the end of the experiment, each buyer will receive a participation fee of ten Euros.

In the second treatment, there will be a difference in information disclosure. After each trading round, sellers will know the choices from all sellers. Thus, sellers will have the information about the color and shape combination that other sellers chose in the previous trading round to sell before they make their selling choices for the next round of trading. Sellers will still only know individually and privately how many buyers decided to buy what they offered to sell, meaning, they will not know how many buyers decided to buy the products offered by the other sellers. All other procedures are the same as in the first treatment.

At the end of the session, participants will receive their payment, sellers will receive according to the points they earned through the experiment according to the previously specified translation from points to Euros, and buyers will receive the participation fee.

#### *4.3.3. Experiment Procedure*

The experiment will take place at UAB, and subjects will be recruited from the student pool through notices published on announcement boards around the campus. In order to run each session a total of fifteen subjects are necessary. The two distinct treatments in the experiment must have different participants, so there must be two groups of fifteen participants available for the experiment.

The funding required for each session is needed for paying the subjects for their participation, and for buying the products and printing the labels. For participants, around 150 Euros is needed per session, being 10 Euros for each one of the ten buyers, and on total all five sellers are expected to earn around 50 Euros.



Two separate and adjoin rooms must be available during the experiment, one for the sellers and another one for the buyers. In the room for the sellers, each one of them has to be sat in individual cubicles so they will not be able to communicate nor to see each other. In the room for the buyers, part of the room area must be blocked so buyers can see the products displayed on a table and rank their choices individually and privately without the other buyers being able to see the buyer during the process.

Once sellers choose the labels to display on the products, experimenters will move the products from the sellers' room to display them in the buyers' room. After the buyers finish their turn, the products displayed during the trading round will be removed. Only then a new trading round will start.

#### *4.3.4. Hypotheses Testing and Data*

As explained above, there is a restriction in the number of color and shape combinations available in the experiment design. Two combinations are consistent: one with a hot color and a hot shape (red triangle), and the other one with a cold color and a cold shape (blue rectangle). Two combinations are inconsistent: one with a hot color and a cold shape (red rectangle), and the other one with a cold color and a hot shape (blue triangle).

This restriction is due first to the fact that to test the hypotheses there is a need to control the combinations in a way that they are clearly consistent or inconsistent, and at the same time there is only one combination in each of the four possible basic cases (hot-hot, cold-cold, hot-cold, cold-hot). Also there is a practical restriction in terms of buying less products and printing a smaller number of actual labels for the trading rounds. In a possible further extension of the experiment, as explained below, a larger number of combinations could be available, so there would be a larger number of combinations in each of the four basic combination cases.

With this restriction in combinations, only four, the hypotheses can be tested with more rigor and control. For example, when a seller chooses a combination in a trading round, and changes it in the next round, the seller will necessarily have to change to a different basic case. If instead of four combinations, one for each basic case, there are more combinations available, when a seller changes the combination from one trading round to the next, there is a possibility that the change will take place in the same basic case, and thus information will not be as relevant for the hypotheses testing.

When a seller changes from one of the four basic cases to another basic case from one trading session to the next, the data will allow knowing what is the effect on the number of buyers that choose the new color and shape combination. According to the hypotheses, when a seller changes from a consistent combination to a combination that is not consistent, the number of buyers should decrease. Alternatively, when a buyer changes from an inconsistent combination to a consistent one, the number of buyers should increase.

As for the data that buyers will provide when ranking their buying choices, it will be important to check whether buyers rank consistent combinations higher than combinations which are not consistent. Also, this data will allow testing the reactions

buyers have to changes imposed by sellers in each trading session.

#### *4.3.5. Further Extension*

In this experiment design there is a limitation in the number of colors and shapes, only two colors, a hot color and a cold one, and only two shapes, also a hot shape and a cold one, in a total of four combinations. This limitation is also owed to practical reasons, since a greater number of combinations would require a higher cost in buying products and printing the actual labels to be displayed in the products by the sellers.

A further experiment design could include more colors and shapes, from the current 2x2 attributes, with four color and shapes combinations, two being considered consistent and two inconsistent, the design could be amplified to a 4x4 (with sixteen combinations, eight consistent and eight inconsistent) or to a 6x6 (with thirty six combinations, being eighteen consistent and eighteen inconsistent).

One of the limitations of the experiment, which has to be further developed, is how to pay buyers in such a way that will give them the right incentive to disclose their true preferences.

### **5. Conclusion**

When they choose among competing products consumers are faced with quality and product performance uncertainty, hence, they rely on cues as extrinsic attributes, for instance brand, price, package and warranty, as signals of perceived quality. Little research has been done on packages as extrinsic attributes used by consumers as signs of perceived quality, thus this study is a small contribution to that lack of scholarly research on packages.

Colors and shapes are important elements of marketing strategies, and they are both essential features of packages, especially in product labels. Labels are one of the most important features of product packaging, and they are designed to communicate a message. The model proposed in this study builds on previous models of consumer quality perception and signals of quality from product cues. In this research, colors and shapes combinations in labels are considered as the extrinsic attributes used as signals of quality by consumers.

An intermediary research was developed to uncover the meanings of shapes and how these relate to the meanings of colors. The preliminary results showed that there is a coincidence in meaning between 'hot' colors as red and certain pointed shapes as triangle, pentagon, diamond, and also a coincidence in meaning between 'cold' colors as blue and green with more stable shapes as square and rectangles. As a result, more symmetrical and stable shapes as square and rectangle are situated towards the passive end of the active scale spectrum with the cold colors, whereas shapes with sharp ends as isosceles triangle, diamond and pentagon are located in the more active end of the spectrum with the hot colors.

Therefore, in the research hypotheses proposed in this research, in accordance with the

cue consistency theory, the prediction is that when the two extrinsic attributes, namely, color and shape, are combined in a consistent way in a product label, the overall product quality perception is enhanced, and when color and shape are inconsistently matched, product quality perception is weaker. A consistent color and shape combination occurs when color and shape have a similar meaning, a few examples are: red and triangle, square and blue, rectangle and green.

In order to test the research hypotheses an experiment design was developed. The goal is to establish an experiment for the empirical validity of the research hypotheses and to demonstrate that consumers' quality perception responses to the two extrinsic cues, colors and shapes in product labels, are consistent with the cue consistency theory predictions. In this sense, the two extrinsic attributes considered, color and shape, can be matched in a way in which both cues can provide a combination that corroborates each other in a consistent manner, or on the contrary, colors and shapes can be combined in such a way that their combination is not consistent.

In this experiment colors and shapes are the cues used as signals of quality perception by sellers and buyers. Some specific products, experience goods, i.e. beverages, will be traded among sellers and buyers, and the only quality signal used by all sellers and buyers are color and shape combinations in product labels.

When the experiment proposed in this study is carried out, the results are expected to confirm the predictions set forward by the two research hypotheses; consequently, there exists certain color and shape combinations which improve product quality perception, while other combinations worsen it.

Product appearance can influence consumers in many different ways. Insights into the different ways in which appearance characteristics, such as form and color, may influence consumer choice, and by differentiating the roles played by product appearance managers can make a better use of packaging and labels as marketing tools. Colors are a fundamental variable in marketing decisions. Inappropriate choice of product package or label color and shape may lead to strategic marketing failure. Furthermore, color is the least expensive way of changing a product. Thus marketing management has a lot to gain from acquiring a more acute knowledge about the meanings consumers give to colors and shapes and how they use these two attributes to perceive product quality. It is possible to improve packaging and label design . Additionally, being able to design experiments using both colors and shapes to elicit consumers' perceived quality and purchase intent is a powerful tool for managers.

Further research could comprise new experiments using other experience goods. Of especial interest would be to include experience goods in the service sector, such as hotels, restaurants, financial services, jobs, teams.

As in every research, this one has its limitations. Among the obvious ones, the small sample used in the preliminary intermediary research that related the meanings of colors and meanings of shapes has to be improved with a larger and significant sample. Also, the lack of an actual experiment hinders any conclusion and generalization of the research hypotheses proposed.

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Figure 3. The cross-cultural spectrum of meanings and associations of color in marketing

Colour	Country–Culture cluster								
	Anglo-Saxon	Germanic	Latin	Nordic	Slavic	Chinese	Japanese	Korean	ASEAN
White	Purity	–	–	–	–	Death	Death	Death	Death
Blue	Happiness	–	–	–	–	Mourning	Mourning	Mourning	Mourning
	High quality	Warm	–	Cold	–	High quality	High quality	High quality	Cold
Green	Corporate	Feminine	–	Masculine	–	Trustworthy	Trustworthy	Trustworthy	Evil
	Masculine	–	–	–	–	–	–	–	(Malaysia)
Yellow	Envy	–	Envy	–	–	Pure	Love	Pure	Danger
	Good taste	–	–	–	–	Reliable	Happy	Adventure	Disease
Red	Happy	Envy	Envy	–	Envy	Pure	Envy	Happiness	–
	Jealousy	Jealousy	Infidelity	–	–	Good taste	Good taste	Good taste	–
Purple	–	–	–	–	–	Royal	–	–	–
	Masculine	Fear	Masculine	Positive	Fear	Authority	–	–	–
Black	Love	Anger	–	–	Anger	Love	Love	Love	–
	Lust	Jealousy	–	–	Jealousy	Happiness	Anger	Adventure	–
Orange	Fear	–	–	–	–	Lucky	Jealousy	Good taste	–
	Anger	–	–	–	–	–	–	–	–
Pink	Authority	–	–	–	Anger	Expensive	Expensive	Expensive	–
	Power	–	–	–	Envy	Love	Sin	Love	–
Grey	–	–	–	–	Jealousy	–	Fear	–	–
	Expensive	Fear	Fear	–	Fear	Expensive	Expensive	Expensive	–
Brown	Fear	Anger	Anger	–	Anger	Powerful	Powerful	Powerful	–
	Grief	Grief	Grief	–	–	–	–	–	–

Source: Aslam, M. M. (2006). Are You Selling the Right Color? A Cross-cultural Review of Color as a Marketing Cue. *Journal of Marketing Communications*, Vol. 12, No. 1, pp. 15-30.

Figure 4. Colors and Shapes Active Scale

Source: Madden et al. (2000) & author's calculations.

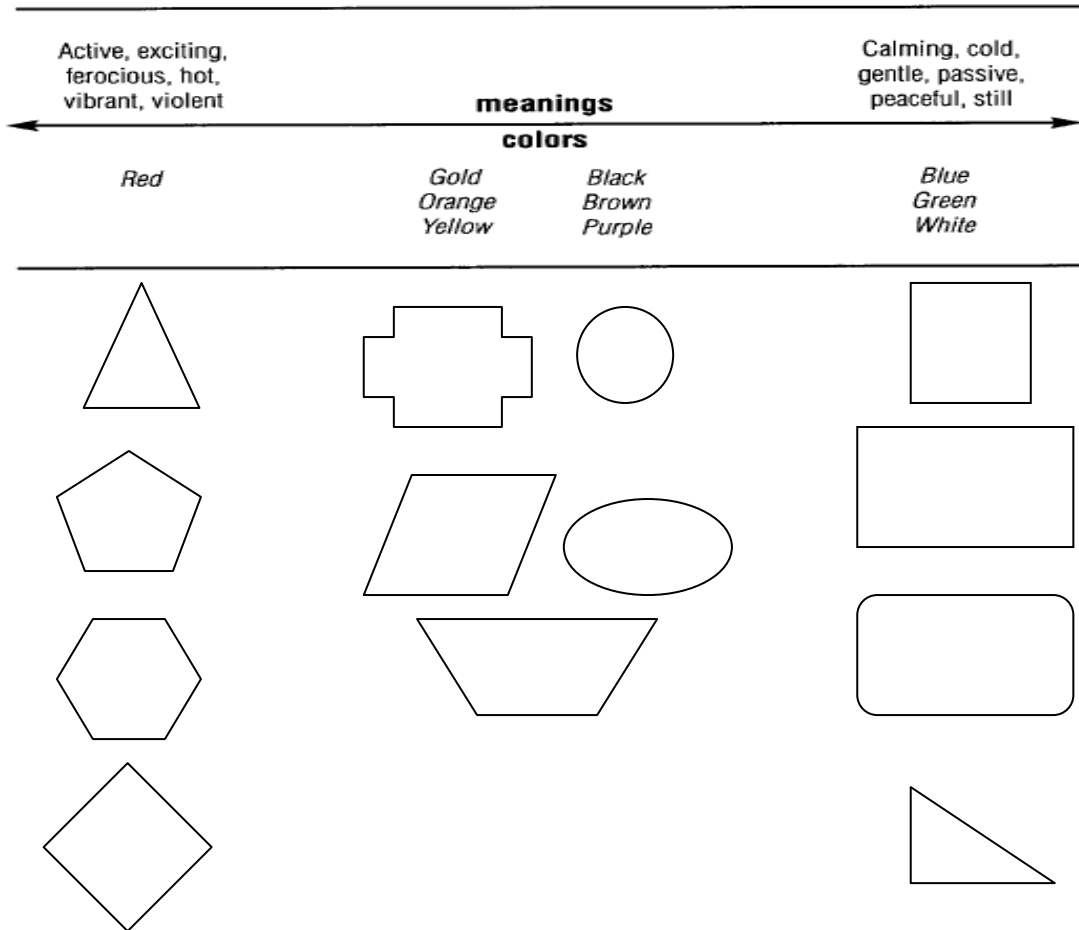


Figure 5. A Model Relating Color, Shape, Label, Package and Quality.

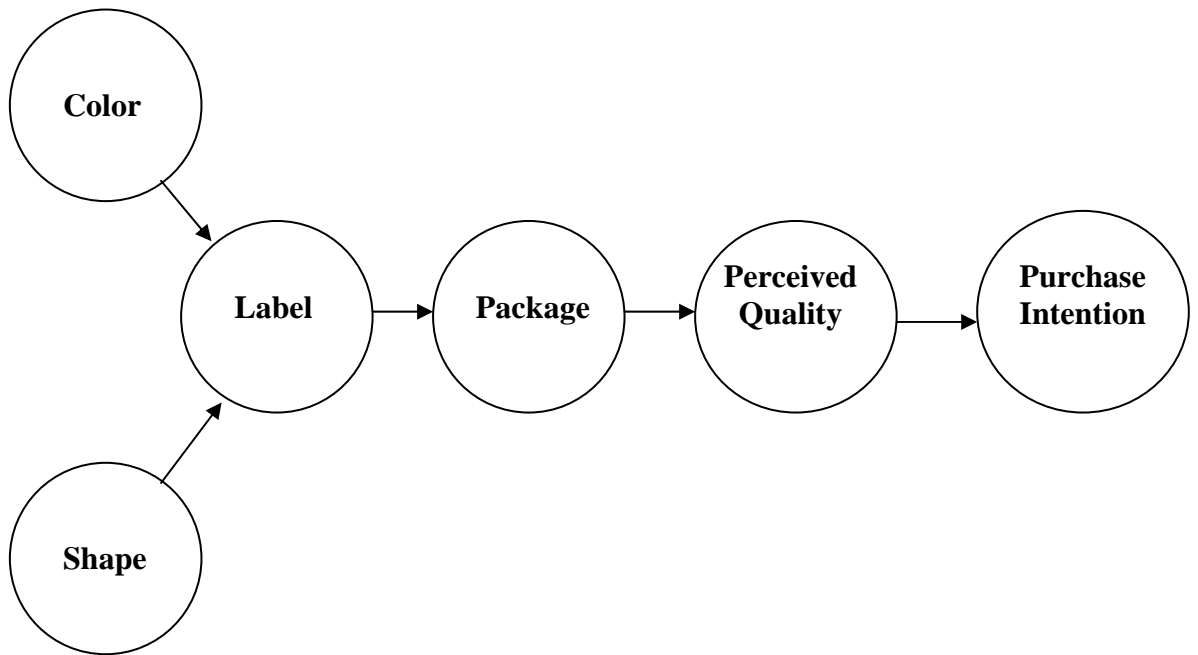


Figure 6. Research Hypotheses Proposed.







	WHITE	BLUE	GREEN	YELLOW	ORANGE	RED
	(		)	(		)
	(	H1	)	(	H2	)
	(		)	(		)
	(		)	(		)
	(	H2	)	(	H1	)
	(		)	(		)

Figure 7. Consistent and Inconsistent Color and Shape Combinations.

	WHITE	BLUE	GREEN	YELLOW	ORANGE	RED
	=	=	=	≠	≠	≠
	=	=	=	≠	≠	≠
	=	=	=	≠	≠	≠
	≠	≠	≠	=	=	=
	≠	≠	≠	=	=	=
	≠	≠	≠	=	=	=

