

Effect of Metal Can Labels on Consumer Attention through Eye Tracking Methodology

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Abstract

In today's market there are a growing number of packaged goods on the shelves that consumers have to sift through in order to make purchasing decision. To stand out from the competition, companies often times change a product's packaging to revolutionize the product or add important information to the package. Changing the package design can be risky for repeated customers because they become conditioned to the old package design. A private canning company worked with our researchers to conduct an eye tracking study in CUshop™ at PackExpo (tradeshaw) 2014 in Chicago, Il to examine the effect of newly added labels on canned creole.

Through a collaborative study at this trade show, quantitative and qualitative data was collected on three different canned creole packaging. A total of 272 participants took place in this study to evaluate if adding "can facts" to the package label and litho printing the ends of the cans had an effect on consumer attention compared to the control can. Three eye tracking metrics were tested and statistical analysis yielded significant results for the can facts and litho ends compared to the control for the Total Fixation Duration (TFD) metric. Participants viewed the can fact cans and litho end cans significantly longer than the control. Survey findings found that participants preferred the litho ends 75% compared to the control and the can facts 53% compared to the control.

Keywords: brand loyalty, consumer behavior, eye tracking, label design, purchase decisions

1. Introduction

Packaging does not only deal with containing the product on the store shelf, but also works to attract the consumer's attention and establish the brands image (Prendergast & Pitt, 2009). The package plays a crucial role in communicating product benefits to the customer in a way that is both appealing and beneficial to the consumer (Prendergast & Pitt, 2009; Rundh, 2009). An example of this is changing the location, color, and/or text of labels to insight consumer attention or to make the product stand out on the shelf. Eye tracking in a retail environment can be used to compare label designs when compared to a control or competitors on the market. Eye tracking software can be used to capture the eye movements of participants in order to determine the influence of a package design on the shelf (Drew & Meyer, 2008). Ultimately, the goal of this research was to analyze the effect of different labeling methods on consumer attention through eye tracking methodology.

2. Material Studied

It is of utmost importance that the package provides consumers with information they need to persuade them to purchase a certain product over another (Packaging Strategies, 2015; Golan et al., 2001). This information is often provided through labeling in a variety of different ways. Labeling is critical in the packaging process because there are so many choices for consumers to make and it can assist in differentiating products on the shelf (Golan et al., 2001). The label needs to be visually appealing to the consumer as well as meet all the legal requirements. Legally, it is mandated that every label has the product type, the producer's name or location, the quantity, and the number and size of servings (if applicable) (Packaging Strategies, 2015). Package designers work to include all this information in an innovative way that will sell the product such as apparent size of text, attention drawing power, impression quality, and brand name readability (Packaging Strategies, 2015).

Hundreds of companies change their package each year in order to modernize their brand (Chaudhary, 2016). However, this innovation does not come without risks. Oftentimes, consumers want to be able to go into a store,

find the product they are looking for and leave as quickly as possible. For this fast transaction to occur, the product has to be easily recognizable to the consumer. If a product is altered even in the slightest way, some rebrand conditioning may need to occur in order for consumers to be able to easily identify the product. Establishing a brand that is recognizable to consumers is extremely important in the purchase decision. Successful branding creates consumer recognition by disseminating what the brand means through the use of pictures, designs, and symbol (MacInnis, 1999).

Many studies have focused on helping consumers better understand the nutritional labels on foods. It has been found that consumers do not understand these labels to their full advantage, and modifying existing labels could be a benefit to consumers (Graham & Jeffery, 2011). Previous research has been done on eye tracking labels and the effects of positioning. A research study was conducted by the University of Minnesota to determine how consumers view nutrition facts labels and whether the location of the labels changes their attention (Graham & Jeffery, 2011). The results indicated that the labeling at the top of the can were viewed more than at the bottom, while labels in the center were viewed more than the sides (Graham & Jeffery, 2011). Eye tracking can be seen as a viable technology to test label placement in reference to consumer attention.

For this type of study, eye tracking allows marketers to pretest the shelf impact of packages, products, or point-of sale systems before introducing them at full-scale (Graham & Jeffery, 2011). Its availability has recently grown across new markets and can be tested on subjects using a monitor or with glasses in a controlled environment. Eye-tracking software is used to capture the eye movement of subjects that can tell a story of where consumers focus their attention in a retail environment.

3. Methods

4.1 Location and Stimuli

The study took place in CUshop™ Consumer Experience Laboratory relocated to Pack Expo, a four-day tradeshow in Chicago, IL. CUshop™ is a realistic shopping environment featuring shopping aisles, a frozen food section, produce area and simulated open refrigeration areas (Figure 1).

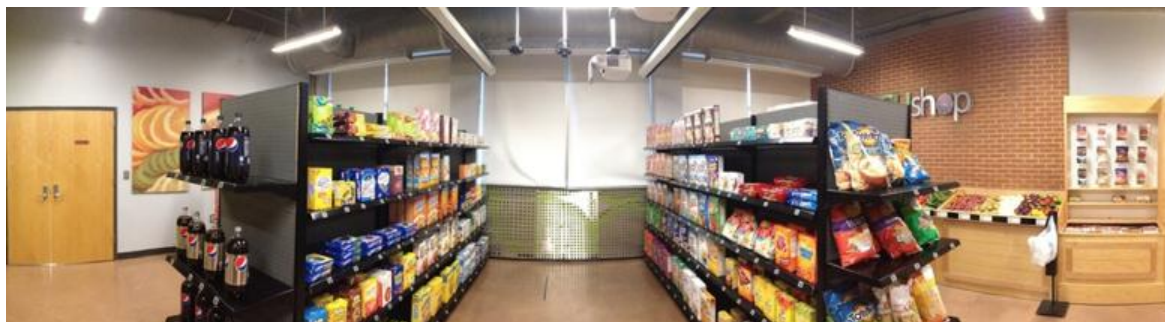


Figure 1. CUshop™

Three different creole cans (control, can facts, and litho ends) were provided by a private canning company. The creole cans were arranged as a bottom shelf display with only one stimulus can on the shelf per day. The control was on the shelf for day 1, litho ends for day 2, and can facts for days 3 and 4 (Table 1). The litho ends were created using a lithograph technique capable of printing metal/tinplate products and steel containers that utilizes a four color process and straight line graphics on a combination of UV ink and traditional presses. The tested treatments were not exhibited for the same period of time to avoid bias between varying stimuli. The products tested were placed on the shelf individually and isolated so that participants could see the product as it is rather than comparing it to various stimuli. By testing the products at different time periods, we are avoiding “beauty contests” between packages.

Table 1. Different tested treatments of cans

Day of Study	Day 1	Day 2	Day 3	Day 4
Type of Can	Control	Litho ends	Can facts	Can facts
Characteristics	Typical can with a wrap around label	Wrap around label and label at top of can using a lithograph technique	Wrap around label and “Did you know” facts about the product	Wrap around label and “Did you know” facts about the product

4.2 Apparatus

Tobii™ Eye Tracking Glasses were used to record the participants' eye movements. These glasses are monocular video-based pupil and corneal reflection glasses, which sample from the right eye at a sampling rate of 30Hz with a 56° x 40° recording visual angle. A Tobii™ Recording Assistant gathers the eye tracking data, a snapshot of the area of analysis, and a video of the participant's visual field, storing the positions of the IR markers on a memory card. In addition to gathering the data, the Recording Assistant guides the researcher through the calibration process, showing the quality of each calibration. The Tobii glasses connect to the Recording Assistant. Infrared (IR) markers, each containing a unique ID number, were placed in cradles around the stimulus of interest. Using infrared light, these IR markers communicate their location to the glasses. An individual IR marker also functions as a tool for calibrating the participant to the glasses.

4.3 Experimental Design

Canned creole stimuli were placed in the canned food section of CUshop™. The control, can facts, and litho end stimuli were rotated per day so that side by side shelf presence would not influence the participants viewing the creole. This study wanted to eliminate the participants from choosing between the two variations, but rather just see the product for what it was. Each stimulus has Areas of Analysis (AOA's) and Areas of Interest (AOI) that were mapped on a high resolution image using Tobii Studio. The AOA's are determined by the location of the IR markers on the store shelves, which is defined as the area where the eye tracking data is recorded for each participant (Hurley et al., 2015). Each creole stimulus has a particular Area of Interest (AOI) that is located inside the AOA. Eye tracking data was compared for the AOI's for the three stimuli of creole (control, can facts, litho ends).

4.4 Procedure

The participant was first asked to carefully put the eye tracking glasses on and tighten the strap around the back of their heads for security. The glasses were connected to the Recording Assistant, which was held by the researcher during calibration. The participants were then told to stand on a marker placed one meter from a vertically standing sign and to look straight ahead at the sign while keeping their heads still. Once the instrument found the location of the subject's right pupil, the Recording Assistant displayed a 3x3 grid for the researcher to use as a reference for the nine-point calibration process. The researcher then took an IR marker and placed it on the sign. The participants were instructed to follow the IR markers with their eyes as it moved to each of the reference points until their pupils were detected at all nine points. The researcher then hit "Record" on the Recording Assistant, allowing the instrument to start gathering eye tracking data.

Once the calibration was complete, the participant was given a clipboard with a shopping list, identified by a unique ID number, which, in turn, became the subject's participant number. The participants were instructed to shop for each product on the list as they normally would in a grocery store, writing down the number corresponding to the product they purchased for each item on the list. The participants were then sent into the CUshop™ and requested to shop normally. Once the shopping task was completed, the participants were led to a survey computer, where each answered demographic and study-related questions.

4.5 Data Collection and Eye Tracking Metrics

Areas of Interest (AOI's) were designated for the creole stimuli and used to determine three measurements metrics of eye movement: Time to First Fixation (TTFF), Total Fixation Duration (TFD), and Fixation Count (FC). The time in seconds from when a product first enters a participant's field of view until they fixate on it is defined as the TTFF. The lower the number, the better the package performed in this instance. TFD, is the time, in seconds, spent on average by participants fixating on this item. The higher the number, the better the package performed. FC is the total number of times a participant's scan of the planogram crossed into a particular area of interest.

A survey created through SurveyMonkey.com including questions on the product and demographic information was created in conjunction with the private label company. Tobii Studio was used to collect raw eye tracking data and run statistical analysis. Using SAS® Studio, an Analysis of Variance (ANOVA) was used to determine if the measured data was significantly different (5%) for the three types of canned creole. If indicated that there was significant difference, a LSD multiple comparison test would be used to determine what brands differed

5. Results and Discussion

5.1 Survey Findings

Each participant was asked to complete a quick follow-up survey following the eye tracking portion of the

study. To ensure confidentiality, they were given an ID number for the duration of the study. A total of 237 participants (57% male, 43 % female) took part in the study at the trade show with ages ranging from under 17 to over 65 with 53% between the ages of 21-39. Participants were either married or single (split 50%) with 42% having children and 70% had either a bachelors or graduate degree with a variety of income levels.

The study was based on a volunteer basis and participants were not screened for the items in CUShop™ prior to completing the study. The post survey questions were designed by a collaborative effort with the canned creole company. The survey consisted of questions that showed an image of the canned creole with and without litho ends and asked which can they preferred and why (Figure 2).



Figure 2. Qualitative question on control vs. litho ends canned creole

Participants widely preferred the choice B, the litho end can (75%) with 13% preferring the control (A) and 12% concluding that they both were equally appealing. When asked to explain why preferred either can, the majority of the participants concluded that can B stood out more because of better graphic and color and that the label on the top was overall more appealing. Participants were also asked which can they preferred when comparing the can facts to the control (Figure 3).



Figure 3. Qualitative question on control vs. can facts canned creole

Participants were more split in this instance with 36% preferring the control, 53% the can facts, and 11% concluding that they both were equally appealing. When asked why they preferred either can participants were all across the board with comments such as: would not read that, do not like white line at the top, I did appreciate the nutritional facts, because it showed benefits, and the “DID YOU KNOW” tag line made me look at package B more.

5.2 Eye-Tracking Results and Statistical Analysis

Tobii Studio and SAS® Studio was used to collect and analyze the raw eye tracking data. The mean, standard deviation, and standard error was determined for each participant output for the TTFF, TFD, and FC metric. The data was tested for normality using the Shapiro-Wilk test, and the data was determined to be non-normal. An

ANOVA test was conducted in SAS® because the Central Limit Theorem can apply since the sample size was larger than 30 participants. In order to reduce variability in the samples, an ANOVA test using $\alpha=0.05$ was run comparing the means between the control, litho ends, and can facts (Table 2). An LSD multiple comparison test was used to determine which can were different if significance was found.

Table 2. p-values for ANOVA test of creole cans stimuli (significant result bolded)

Stimuli	TTF	TFD	FC
Creole Cans	0.908	0.0170	0.222

One instance of significance was found between the control and the litho ends and control and can facts for the TFD metric (Figure 4). Participants significantly looked at the can fact cans and litho end cans longer than the control. For this metric there was no significance between the can facts and litho ends. There was no significance found for either the TTF or FC metric meaning that participants did not significantly fixate on any can first or fixate on any one can more than the other.

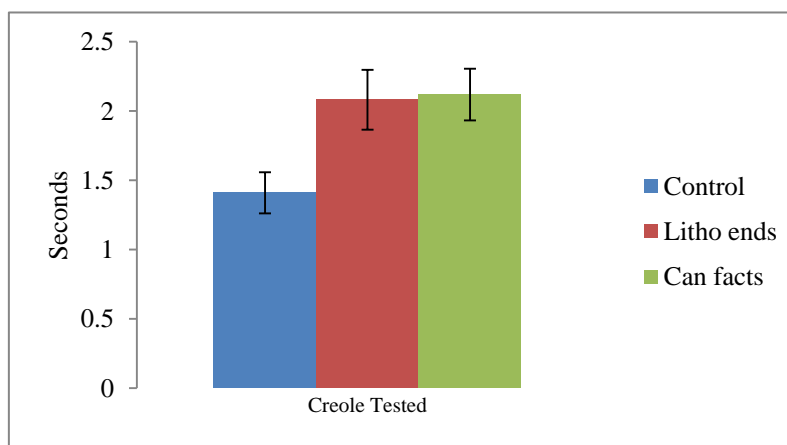


Figure 4. Averaged TFD for each stimulus reported with std. error, $\alpha=0.05$

6. Conclusion

Previous research suggests that consumers prefer labeling on the top compared to the bottom. However, this study is different because it compared additional labeling at the top of the can and litho ends on the lid of the can, which have not been investigated prior to this research. Eye tracking data was analyzed for 237 voluntary participants shopping for canned creole. It was determined that participants focused significantly longer (TFD) on the can facts can and litho ends when compared to the control. Participants may have focused on these can variations longer because they were not used to the added labeling. No significant difference was found for the TTF and FC metric between the can variations.

6.1 Limitations and Implications for Future Research

A potential explanation as to why participants looked longer at both the can fact cans and litho end cans when compared to the control can be referenced back to the brand reconditioning theory. Participants may have looked longer at the two can variations because they were trying to find the brand they were used to and these additions to the cans made it more difficult for them. They may have also looked at these cans longer because they preferred these cans to the control because of the added information (survey results conclude this to be true). In the future it would be useful to add a question on the survey concerning brand recognition in order to determine if this play any role in the participant's choice. The location of the study may also have influenced the results in terms of significance. The study took place in the Midwest, where the stimuli being tested, creole, may not be as well-known or familiar as it is in the South. Participants that were unfamiliar with the product may have not looked at the stimuli at all which could alter the results. In this regard, the location can be considered a new variable for future experiments. In order to test if the location is a factor that affects the results, the same experiment should be tested in different locations to be able to compare results. In order to make sure that the familiarity of consumer and location is not considered as an independent variable of the study, researchers should select participants carefully using a screening process to make sure they are familiar with the tested product. This would allow the only independent variable to be the stimuli in the study itself.

Conflicts of Interest

This study was possible provided by pool of donations from multiple companies to allow students to attend and complete a series of research projects at PackExpo 2014. It should be stated that a company who sells these canned products did sponsor the study and provide the control, litho ends, and can facts samples, but the authors consider the samples and methodology a fair representation of a complete eye tracking study.

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