The Effect of Decorative Foil Stamping on Consumer Attention

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ABSTRACT

Packaging plays a crucial role in communicating product benefits to consumers. Oftentimes, designers use high visibility enhancements to differentiate packaging within the competitive array. Although luxury brands commonly use enhanced graphical and printing techniques to convey high quality products, many private label package designers are also utilizing enhancements to attract attention to their products. This research sought to understand how incorporating foil stamping to the primary panel of fast moving consumer good packaging will affect consumer attention and purchase preference. Through the collection of quantitative data, consumer attention and purchase preference were evaluated. Three different products were selected for evaluation for the study: popcorn, cereal, and boxed pasta dinners. A total of 172 participants completed the study, which took place in a realistic and immersive shopping environment (CUshop™). Two eye tracking metrics were collected using mobile eye tracking technology. Participants completed a qualitative survey, which recorded basic demographic information. Significance tests were conducted to test for statistical differences in consumer attention behavior as well as purchase decision between the foil and control packages. It was determined that foil stamping did significantly ($\alpha =0.05$) affect consumer attention towards the respective product compared to the control, yet the effect was not consistent. Eye tracking metrics varied across the products and categories tested; some foil stamped samples positively affected consumer attention, others negatively and some had no effect whatsoever. Results show that foil stamping can be a highly strategic influencer (both positively and negatively) on consumer attention and purchase decision. However, it is recommended that this enhancement be tested within an in-context environment to ensure it benefits the brand and product within the competitive array.
Key Words:

packaging, foil stamping, eye tracking, consumer attention

INTRODUCTION

Package design plays a significant role in attracting consumer attention while at the same time establishing a brand’s image [1]. Since the package typically is a customer’s first experience with a particular brand, it plays a key role in communicating the product’s benefits to the consumer [1, 2]. As a result, designers must create packaging that commands attention when situated alongside competing products [3]. One way this high-end visibility and presence can be achieved is through enhancements such as foil stamping that attract consumers by creating a rich and elegant identity for a product. [4]. Such a package can help differentiate a product through the visual experience it creates for the consumer [5].

This research investigated the use of enhancements, specifically foil stamping, as a legitimate tactic to increase consumer attention on fast-moving consumer goods (FMCG) by creating a premium visual experience for the shopper. To do so, this study evaluated three grocery product categories: popcorn, 2 varieties of cereal, and boxed pasta dinners. It hypothesized that foil stamping on packaging will decrease time to first fixation and increase total fixation duration. In addition, since past research has found that increased attention leads to increased sales, it further hypothesized that participants will select foil stamped packages for purchase more often than non-foil stamped items [6]. The purchase behavior was observed by recording product sales and using eye tracking to identify the participant’s attention to the packaging stimuli, collecting quantitative data on the two metrics of time to first fixation (TTFF) and total fixation duration (TFD). In addition, qualitative data were collected through preference surveys. Statistical analyses were subsequently conducted to compare participant attention to the foil stamped vs. control, non-foil stamped products, with the goal of this research being to quantify the effect foil stamping has on consumer attention to products. The results found here should provide designers and brand owners’ data to justify the increased cost of implementing foil stamping on packaging.

BACKGROUND

Packaging plays an essential part during the point-of-sale because the visual elements of a package play a key role in communicating product benefits to the customer [7]. Embellishments like foil stamping, which influence attention, thus, can strengthen this moment [7]. This is especially true in low involvement situations when the consumer has little time to consider other aspects of the product. In addition, the trend toward hypermarkets and the movement of packaged food products into these larger stores create a more competitive market, thus emphasizing the need for enhanced design features to strengthen branding at the point of sale [8]. Previous research suggests that packaging form, function, and appearance can be a powerful influences on consumer attention and purchase choice, more influential at the point of purchase than other communication tools because of their ease of availability [9]. For example, a recent study found that the location of the product image on the package influences consumer perception of the visual “heaviness” of the product and evaluation of the package [10]. As this finding suggests, packaging design is influential...
during the decision-making process, guiding consumer involvement with a retail category [11].

Since package design has been found to influence consumers’ perceptions of the product as well as being able to direct the consumer’s navigation of the design elements, package designers make important decisions that directly affect the perceived quality of both the product and the brand. Often, consumers are drawn to products that are familiar to them or that they have purchased before. Bloch’s theoretical model of consumer response to products suggests that the two cognitive responses affected by product design are beliefs about and the categorization of the product [13]. In his model, Bloch highlights the importance of the package for evoking desired consumer responses [14] as he focused on how product form can influence cognitive and positive and negative emotions that result in behavioral response. Crilly et al. (2004) expanded his model by incorporating design [14,15], focusing on the designer’s perspective. They see package design as a way to communicate between packaging and consumers, one which can encourage specific consumer responses through the selection of varying textures, materials, colors and print methods [14,15]. The preconceived knowledge or belief about a particular product may also lead to increased attention during the shopping experience, suggesting that the ability of a stimulus to command attention is a criterion for information processing [16]. Packaging design also uses marketing stimuli such as brand names or unique designs (e.g. foil stamping) to attract and/or maintain consumer attention [16], supported by the fact that 90 percent of consumers make their purchase decisions after looking only at the front of the package and 85 percent purchase an item without considering alternative products [17]. Shoppers “buy with their eyes” in retail environments, supporting the importance of embracing a strategic design philosophy along with an in-context evaluation of the attention the design receives from the target audience.

Specific stimulus characteristics that prompt consumer response are color, size, the incorporation of complex stimuli, and the degree of novelty of the stimulus [16]. Embossing, holography, and foil stamping may directly impact each of these attributes, creating a rich, elegant effect that has the potential to separate a package from its competitors. The foil stamping technique can be applied to fiberboard, metal, or plastic substrates in which brand identity, text, and/or images are typically foil stamped on a package [4]. The use of foil stamping in a consumer environment can increase the probability that shoppers change or interrupt existing patterns of choice and behavior [18], demonstrating a positive effect on consumer attention by exhibiting characteristics that contrast with other stimuli within the same product category (e.g. cereal or beverages) [14,16]. Since foil stamping is intended to enhance the premium image of a package, it should be tested in a retail environment to evaluate its effect [14], the purpose of the research reported here. This study investigated the use of foil stamping on three different products, cereal, popcorn, and boxed pasta dinners, to determine if it generated a positive impact on consumers by increasing their attention and decreasing the time to find the package compared to identical packages without foil stamping.

This study utilized eye tracking technology, a technique that measures a person’s point of gaze [3], providing insight into what draws observers’ attention and their resulting cognitive processing [19]. This technology follows the eye of the subject, tracking its movements while looking at an object or area [3]. Currently, eye tracking is used in many aspects of market research, including TV advertisements, billboards, websites and packaging. Though there are many metrics that eye tracking and other biometric devices measure, this study used two core metrics for packaging, time to first fixation (TTFF) and total fixation duration (TFD). TTFF reveals the
time between when a participant views an area of analysis (AOA) until the stimuli is viewed. Is it typically desired that the object being studied exhibit a shorter TTFF than the control as it is indicative that this stimuli was faster to find. The study reported here hypothesized that foil stamping would decrease the TTFF compared to the non-foil stamped control packaging. TFD represents the total amount of time spent observing the stimuli, meaning that a higher value is typically desired.

Qualitative researchers use eye tracking as a way to chart human perception. Even though the participants may not be aware of where they looked, a researcher can collect eye tracking information and form opinions concerning different areas of interest (AOI) on an object, specifically a package [3]. Packaging designers can gather data to show which areas of the package attract the most attention and, equally as important, those where attention is absent [3].

Several studies have used eye tracking to collect quantitative consumer attention data [20], one observing how private and public label packaging affect consumer behavior. In this study, eye tracking was used to gather data to gain an understanding of how varying label types influence attention and purchase preference, the results finding that the participants preferred public-branded packaging compared to the private label brands based on eye tracking data and purchase decision [21]. A similar study explored if the amount of physical product visible from the primary display panel affected consumer attention and purchase preference. Eye tracking data were collected from four stimuli, each with a different amount of physical product displayed. The results found that participants viewed packaging with the most physical product exposure faster and longer, ultimately purchasing these products more frequently. These studies were essential in developing an eye tracking methodology to gather quantitative consumer attention data for the foil stamped products investigated here [22].

**MATERIALS AND METHODS**

**Materials**

Three different product categories were analyzed, two types of cereal, popcorn, and boxed pasta dinners (Figures 1-4). Each of these products represents a different FMCG category and would probably not appear on the same aisle of a supermarket. Professionally manufactured packaging was provided by a foil-stamping supplier in the USA. Each sub-brand analyzed was identical; with the exception that foil stamping was not present on the control packaging, which was made of coated recycled paperboard. Foil stamping was applied to all package stimuli using the flat foil stamping method, in which a flat metal stamp transfers the foil onto the coated substrate, resulting in a slight rise on the surface.

**Figure 1. Raisin Cereal 1 Stimuli - Control (Left) & Foil (Right). Note: the brand and sub-brand have been obfuscated for confidentiality purposes.**

**Figure 2. Raisin Cereal 2 Stimuli - Control (Left) & Foil (Right). Note: the brand and sub-brand have been obfuscated for confidentiality purposes.**
OVERVIEW

The purpose of this research was to determine if applying foil stamping to FMCG secondary packaging affects consumer attention and purchase decision. This research was conducted at the CUshop™ set up at the PMMI Pack Expo 2013 in Las Vegas, Nevada. Data were collected using mobile eye tracking technology, with assessment of the eye tracking metrics, total fixation duration (TFD) and time to first fixation (TTFF), being used to determine the significant difference, if any, between consumer attention to packaging embellished with foil stamping compared to identical designs without foil stamping. Participants’ purchase decisions were also evaluated to determine if applying foil stamping to packaging led to increased sales over the control products. A shopping list indicating items to be selected for purchase was provided to each participant before entering the CUshop™. In addition, each participant completed a qualitative survey, reporting demographic data and addressing images of the packaging stimuli.

PARTICIPANTS

The study involved a total of 172 participants, 119 males and 53 females ranging from in age from 18-65. All participants approached the study voluntarily, and no incentive was provided. All participants were registered attendees of PackExpo 2013, and represented a global audience. This study took place over a three-day period. Prior to the study, all participants were given a unique reference number to link their shopping lists, eye tracking data, and survey data.

EYE TRACKING 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.
EXPERIMENTAL DESIGN

Five different package comparisons, a control and foil version of each package, were evaluated in this study over the course of three days. Each of the three product categories tested, cereal, popcorn, and boxed pasta dinners, was selected because it represents a distinctly different FMCG product common to most retail grocery stores. The experiment was divided into two distinct phases: a control phase, where foil was not present on the products, and a variable phase, where the foil stamped products were displayed. The control and variable phases varied among the three product categories to ensure that not all foil stamped packages appeared on the shelves at the same time. The two types Raisin Bran cereal, Extra Raisins Raisin Bran and Crunchy Raisin Bran, were placed side by side on the shelf (Figure 5).

![Figure 5. Snapshot taken with the Tobii™ Glasses of the raisin cereal stimuli. Note: the brand and sub-brand have been obfuscated for confidentiality purposes.](image)

Other cereal products from the same brand surrounded the two Raisin Bran boxes, with the entire 12’ shelving unit containing different brands of cereal, both national and private label. While no other brands of raisin cereal were placed on the shelves, it appeared on the shopping list so that participants would be directed to the stimuli. By having two different types of raisin cereal, participants were able to choose to purchase. Raisin cereal was tested over the course of the three days. On Day 1, the control day, both non-foil raisin cereal products were placed on the shelves, while on Day 2, the non-foil extra raisin packaging was replaced with the foil version of the package and on Day 3, the non-foil extra raisin was back on the shelf and the crunchy raisin was replaced with the foil version.

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<th>Table 1. Experimental Design of Cereal</th>
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<td>Crunchy Raisin Non-Foil</td>
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<td>Extra Raisin Non-Foil</td>
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<td>Crunchy Raisin Foil</td>
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This process is shown in Table 1.

Fat free popcorn was placed on a shelf with five other private label popcorn boxes (Figure 6). Three of the boxes, including the stimulus, were a 9-oz. 3-pack box of 94% fat free popcorn. Two larger popcorn boxes were placed next to these on the shelf. Popcorn appeared on the shopping list, allowing the participant to make a choice based on these five popcorn packages. Popcorn was tested over two days. On the first day, the foil package was tested, with Day 3 of the study being the control day for the popcorn where the non-foil package was tested. This

<table>
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<th>Table 2. Experimental Design of Fat Free Popcorn</th>
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Three types of packaged pasta dinners, specifically, lasagna, three cheese and cheeseburger, were tested (Figure 7). They were placed on a shelf with both a private label and national brand of boxed pasta dinner. On the shopping list, participants were instructed to shop for a boxed pasta meal. The boxed pasta dinners were tested on all three days of the study. On Day 1, the foil stamped packages were investigated, while on Day 2, the foil lasagna and cheeseburger meals were replaced with the non-foil stamped packages and the three cheese foil package remained on the shelf. This allowed for one foil stamped package to be investigated in the context of non-foil stamped products. On Day 3 of the study, all of the boxed pasta dinners on the shelf contained no foil stamping. The process is shown in Table 3.

The participants were instructed to write down the item number they were to select to purchase on the shopping list provided to them prior to entering the CUshop™. In addition to raisin cereal, popcorn, and boxed pasta dinner, other items not relevant to this study were included to obfuscate the intent of the experiment. The order in which the items appeared on the list was randomized for each participant. All of the stimuli were shelved at eye level to maximize the accuracy of the study.

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<th>Table 3. Experimental Design of Boxed Pasta Dinners</th>
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<td>Day 1</td>
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<td>Three Cheese Non-Foil</td>
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<td>Cheeseburger Non-Foil</td>
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<td>Lasagna Foil</td>
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<td>Three Cheese Foil</td>
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<td>Cheeseburger Foil</td>
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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 researcher led them to a survey computer, where each answered demographic and study-related questions. While the participant completed this survey, the researcher imported the eye tracking data from the memory card to the Tobii Studio. Once the survey was completed, participants were given a bag of popcorn and dismissed.

EYE TRACKING METRICS

Two eye tracking metrics were used to study participants’ fixation behavior. The first metric, time to first fixation (TTF), is defined as the time in seconds it takes the participants to fixate on the specific area of interest (AOI) once they have entered the surrounding area. The second metric collected, total fixation duration (TFD), is the total time the participant fixates on the AOI. The AOIs must be identified before the metrics can be measured, and for this particular study, all control and stimuli packages were defined as AOI. The AOI was manually defined by the researcher in the Tobii™ Studio prior to analyzing the data. This was completed for the control and variable conditions for each of the five comparisons.

STATISTICAL ANALYSIS

The raw eye tracking data collected using the Tobii Studio were processed in SAS to run the statistical analysis. A Shapiro-Wilk test was first performed to test for normality of the data, the results indicating that the data were not normally distributed. As a result, a non-parametric test, the Wilcoxon Rank Sum Test, was conducted to determine the significance between the variable and control conditions.

RESULTS & DISCUSSION

The TTFF and TFD were averaged for the participants (Figure 8-9). For cereal, no significance was found regarding how quickly participants fixated on the foil stamped product vs. the control for the crunchy raisin cereal (p=.5516); however, participants fixated more quickly on the control extra raisin cereal product (p=.0387). On the other hand, significance was found for the TFD for both cereal products (p<.0001, p=.0002), with the participants looking significantly longer at each of the
foil stamped cereal products vs. the control. Similarly no significance was found for the TTFF for the popcorn stimulus (p=.2042). However significance was found for the TFD between the control and the foil stamped product (p=.0150); unlike for the cereal, it was in favor of the control product.

When all of the foil boxed pasta dinners were compared to all of the control boxed pasta dinners, it was determined that the TTFF was significantly shorter for the foil stamped stimuli than for the control stimuli (p=.0032). Results also found that participants looked significantly longer at the control boxed pasta dinners compared to the foil stamped product (p=.0005). The comparison of the three cheese foil boxed pasta dinners to the control found that participants looked significantly more quickly at the foil stamped products vs. the control (p=.0010). There were no significant differences in participants’ TFD (p=.6099).

The purchase percentages were averaged for the three days of the study, and the varieties were combined. Participants did not purchase the foil crunchy raisin cereal significantly more than the control (p=.2236); however, they did purchase the foil extra raisin cereal significantly more than the control (p=.028). Participants did not purchase significantly more popcorn with the foil stamp (p=.4602), nor did they purchase significantly more three cheese pasta dinners with foil stamping (p=.1357).

The results from the 10 Wilcoxon Rank Sum tests varied among the three product categories. The total fixation duration was longer for both cereal products with packages with foil stamping compared to the control packages, these results indicating the positive impact of the foil stamping on consumer attention. Adding foil stamping to a raisin cereal product will probably also have the same impact.

The method used to test the raisin cereal was a side-by-side approach where two different types of similar products in the same product category were placed on the shelf at the same time. This approach was appropriate because it allowed for participants to make a purchase selection between only the two items being investigated. However, no significance was found for the TFD for popcorn; since the results indicated that participants looked longer at the control popcorn than the popcorn containing foil stamping, foil stamping did not impact customer attention with this product category in the same way as it did for the cereal. The results for popcorn showed that foil stamping did not affect consumer attention in a positive way. The small surface area of the packaging could have contributed to these results as well as the lack of contrast between the foil stamping and the package. Since only one foil stamped popcorn product was placed on the shelf with four other popcorn products, some larger than the stimulus, the foil stamping may not have stood out as much to the participant. Had multiple foil stamped popcorn packages been placed side by side in the CUshop™, the results may have been favored foil stamping. Another contributing factor could be the placement of the item on the shelf. The popcorn was placed at the end of an aisle in the CUshop™ next to the wall. Due to this placement, participants did not have to walk by the popcorn and were not able to view it at from all angles. Being able to view the product from all angles could have allowed the popcorn to be viewed more efficiently.

Adding foil stamping to the boxed pasta dinners resulted in a faster TTFF compared to the control. For this particular product category, the foil stamping benefited the package regarding how quickly the participants fixated on the package. However, it did not increase the TFD among the participants. For this category, the foil provided some benefit but not for all aspects of consumer attention behavior.
CONCLUSIONS

Packages with foil stamping in this study show mixed results. In some instances foil stamping affected consumer attention in a positive way, while in some cases it had no effect, and in a few cases it may have negatively impacted the product in terms of consumer attention. For instance, the TFD was significantly higher for both cereal products tested, and the TTFF was significantly lower for both of the boxed pasta dinner comparisons, a positive indication of faster product identification. Purchase preference for the extra raisin cereal was significantly higher when foil was present. The positive results of the TFD of the cereal compared to the popcorn and boxed pasta may be a result of the size of the package as well as its surface area on the shelf. Other results indicate that foil stamping may have no effect on consumer attention and could possibly even detract from the product. However, the results from this study should not be interpreted, as foil stamping is not significant. Instead, the data provide a strong case for eye tracking and consumer testing, as the effect of foil stamping may be relative to the product, category, package and location on the shelf. Thus, further testing of the effect of embellishments in packaging is critical.

Since foil stamping can increase the probability that consumers change or interrupt existing patterns of choice behavior, the positive results of foil stamping in this study suggest that the stimuli used here exhibited characteristics that contrasted with other stimuli of the same product type. However, the results from this study should be considered carefully as they are limited only to the use of foil stamping and do not include color and contrast as factors that potentially increase attention. Additional research could be conducted using several different foil colors for one particular package. Designers may also want to explore how much foil stamping relative to the package size is needed to make a difference in consumer attention. By using the methodology presented in this research, designers could determine the percentage of surface area needed to make a significant difference in attention, results that would help maximize the benefit of the foil stamping while optimizing the cost.

Package designers are faced with the task of providing disruptive designs in retail. In order to address this situation, they may consider adding foil stamping to a package to increase consumer attention. Based on the results of this study, it can be concluded that consumer reactions to unique packaging vary, so eye tracking may provide valuable insights on the effectiveness of embellishments similar to foil stamping. In addition, the methodology used...
in this research provides a guideline for conducting consumer studies. The original goal of this research was to determine the effectiveness of foil stamping for a few FMCGs. Since the results did not find that foil stamping is effective for every product category, it is expected that response to it may vary significantly, a hypothesis that requires further study.

REFERENCES


