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THE INFLUENCE OF PREMIUM FINISHED PAPER PACKAGING ON CONSUMER
BEHAVIOR

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science
Packaging Science

by
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August 2023

Accepted by:
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ABSTRACT

Companies face the challenge of determining the return on investment of premium paper packaging features, such as substrate thickness and finishing options. If companies can better understand how consumers perceive “premium,” they could channel their focus on specific design elements and maximize their returns (Dwivedi & Nayeem, 2018). Touch is a critical factor in driving consumer behavior and purchase decisions and influencing trust between brands and consumers (Krishna et al. 2017). While previous studies have explored the impact of design elements like size, shape, color, and font on consumer behavior, this research investigates the influence of touch, substrate, print finishes (foil, emboss, and gloss), unboxing experiences of direct mail, and consumer packaged goods. The study employed three unique in-person environments, which collected participant data through eye-tracking, facial expressions analysis, touch coding, and surveys across various consumer activities.

Results indicate that premium packaging generates higher engagement and positive responses from consumers in retail and at-home settings. Foil finish outperforms in the retail environment for unfamiliar CBD serum ($P < 0.0001$). Touch is shown to be a better predictor of sales than visual attention across multiple packaging finishes, including foil ($P = 0.002$), glossy ($P = 0.006$), embossed ($P = 0.007$), and no finish ($P = 0.028$). All participant touches were identified and coded, revealing four unique touch actions (feel, pick up, compare, put in cart).

Premium paperboard packaging evokes more positive facial expressions in consumer electronics unboxing and more interaction with direct mail. Notably,

prominently displaying discount codes increases consumer engagement. Direct mail results reveal that circular mail was widely perceived as recyclable, tri-folds were retained the most, while postcards were more likely to be discarded. These findings have practical implications for businesses, enabling them to optimize packaging strategies, drive consumer engagement, and promote environmentally friendly practices.

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Literature Review

The Impact of Premium Packaging

Packaging has a rich history and has evolved from its early forms used for practical purposes to become an integral part of marketing and brand communication. Early packaging only served functions such as collection, storage, transportation, and marking of possessions (Low & Fullerton, 1994), as well as preserving product integrity and protecting it from various hazards (Stewart, 1995).

In the marketing context, packaging has been recognized as more than just a logistical tool. Pilditch (1961) referred to packaging as "the silent salesman," highlighting its influence on consumer perceptions. Subsequent studies expanded on this concept, viewing packaging as a final pitch to the customer and a temptation that plays a crucial role at the point of sale, especially when consumers have limited time to make purchase decisions (Silayoi & Speece, 2004).

Packaging's significance in marketing is further underscored by its inclusion as the "5th P" in the marketing mix alongside product, price, place, and promotion (Nickels & Jolson, 1976). Particularly in industries like food and beverage, home and personal care, and fast-moving consumer goods, packaging serves as a powerful marketing tool for product enhancement, market segmentation, and product differentiation (Hine, 1995). It achieves these objectives through various elements such as brand logos, colors, fonts, materials, pictorials, product descriptions, shapes, and other components that create strong brand associations (Underwood, 2003). Overall, packaging has evolved into a

strategic and integral part of marketing, facilitating communication with consumers and contributing to brand identity and market success.

Currently, in a highly competitive retail environment, package designers and brands are faced with the necessity of making their products stand out. This phenomenon has been referred to as the "search engine optimization of retail" (Rundh, 2009, p. 111). To attract attention and convey a sense of premium quality, paper companies offer premium grades of paper-based substrates for packaging. In categories such as Food & Beverages (F&B), Home & Personal Care (H&PC), and Fast Moving Consumer Goods (FMCG), the majority of products utilize grades of paper such as Solid Bleached Sulphate (SBS), Solid Bleached Board (SBB), and Folding Box Board (FBB) (*Specialty Products Pages Selector | Sappi Global*, n.d.).

Packaging that communicates a sense of premium-ness becomes crucial for brands selling high-end products (Underwood et al., 2001). Underwood suggests that consumers make quality judgments based on the packaging, which ultimately influences their favorable or unfavorable purchase decisions. One might argue that such embellishments are unnecessary in online shopping, but Tonkin, Holmes, & Hurley (2014) observed in their study that packaging with foil stamping had a positive impact on consumer attention in certain product categories but an uncertain impact on some other categories. This study highlights the nuanced nature of consumer perceptions and suggests that the effectiveness of foil stamping as a packaging element may influence consumer perception through attention. However, Peck and Childers (2003) argue that some consumers experience frustration when they cannot touch the product before

making a purchase. This concept, known as the Need For Touch (NFT), varies among different types of consumers. Balakrishnan and colleagues (2014) explain that even if online sources offer lower prices, certain individuals prefer to spend a little extra by purchasing the product from a retail store for the first time. This allows them to assess the product themselves, and once comfortable, they may switch to online shopping. Although, interaction with packaging for online shopped products cannot be ignored. In their study, Kim, Self, & Bae (2018) refer to the unboxing experience as a critical moment in product appraisal and suggests that companies should pay more attention to product packaging due to increased interest in the momentary unboxing experience.

Aradhna Krishna defines the sensory packaging elements as "triggers" that evoke emotions related to the brand or product's sophistication and quality, ultimately influencing consumer behavior (Krishna, 2012). Establishing an emotional connection with consumers becomes essential when competing for attention and staying memorable in their minds (Biswas, 2016).

While packaging serves as a medium for communication and branding, selecting the most efficient medium from available options can be a dilemma (Spence and Piqueras-Fiszman, 2012). Packaging costs often exceed the cost of the actual product in many categories. Attention-grabbing packages play a significant role in costly products with less apparent benefits or distinctions from their counterparts (Hine, 1995). Dwivedi and Nayeem (2018) argue that customers' perception of a product as "premium" relates to their willingness to pay, which is the maximum amount they are willing to spend. Brands now rely more on consumers' brand experience rather than solely using paper packaging

and labels to sell products and promote sustainability (Hine, 1995). Brand experience, a multi-dimensional concept, encompasses sensations, feelings, cognitions, and behavioral responses evoked by brand-related stimuli across design, identity, packaging, communications, and environments (Dwivedi & Nayeem, 2018; Brakus, 2009). Packaging visual cues, such as nutritional information, price of the product, and labeling, can generate expectations (Guinard et al. 2001). Okamoto and Dan's study (2013) points out that these expectations, which can also be referred to as pre-trial beliefs, often shape an individual's perceptions of the product before use.

In their study "Browse and Switch," Balakrishnan and colleagues (2014) emphasize the importance of retail purchasing in exploring alternative products. Retail shopping allows consumers to compare prices hands-on and form preferences based on the ability to touch and feel items, particularly for high-cost items with significant non-digital attributes.

We experience the world through our five senses, and sensory marketing utilizes sensory stimuli to influence perception, judgment, and behavior. 95% of purchase decisions are subconscious (Krishna, 2012 & Zaltman, 2003). Sensory triggers have a greater persuasive effect on consumers' trust in brand attributes than verbal advertising by the company itself (Sengupta & Gorn, 2002).

The field of consumer neuroscience combines methods and theories from neuroscience with behavioral theories, models, and experimental designs from consumer psychology and related disciplines such as behavioral decision sciences. This interdisciplinary approach aims to develop a neuropsychologically sound theory for

understanding consumer behavior. It is important to distinguish between consumer neuroscience, which refers to academic research at the intersection of neuroscience and consumer psychology, and neuromarketing, which pertains to the practical and commercial interest in utilizing neurophysiological tools like eye-tracking (Plassman & Ramsay, 2012; Kessler & Funari, 2020).

Biometrics

Biometrics involves using sensors to measure and record various signals produced by the body, including facial expressions, eye movements, heart rate, brain signals, and more (Querner-Verkerk, 2019). Sensory evaluation plays a crucial role in assessing the quality of products, and research indicates that it can enhance consumer confidence in both high- and low-quality products (McCabe & Nowlis, 2003). Biometric advancements have facilitated the analysis of intrinsic areas of evaluation that would be challenging without sensory professionals and such technology.

Facial expression analysis is a significant method for capturing consumers' embedded responses that may not always be expressed through words. Mehrabian (1968) proposed an equation stating that the total impact of a message is 7% verbal, 38% vocal, and 55% facial expressions and behavior.

Different techniques have been used to analyze facial reactions, including the Facial Action Coding System (FACS) (Ekman & Friesen, 1978), electromyography (EMG) recordings (Hu et al., 1999), and automatic facial expression recognition (AFER) systems (Danner et al., 2014). EMG recordings measure electric potentials from facial

muscles, but their obtrusiveness can affect the subjects' attention, resulting in a mixture of facial electric signals. FACS is a manual coding system that categorizes visually distinguishable facial movements based on 44 unique reactions called Action Units (AU). While FACS analysis provides information on facial muscle movement, it does not directly reveal the relationship to consumers' actual emotions. AFER systems automatically identify facial expressions, typically focusing on seven basic emotions proposed by Ekman and Friesen (1971): fear, surprise, sadness, happiness, disgust, anger, and neutral.

Automatic Facial Expressions Analysis (AFEA) technology has automated the process of facial coding. It provides additional information on instantaneous responses and their impact on consumers' overall purchase behavior (Krishna, Elder, and Caldara, 2010). AFEA enables complex analysis, and software packages like FaceReader by Noldus are commercially available for facial coding and analysis. FaceReader categorizes facial expressions into six basic emotions: happiness, surprise, fear, sadness, disgust, and anger. It can further classify the overall emotional experience as positive or negative (Kessler & Jiang, 2020).

In a study conducted by Savela-Huovinen et al. (2021), sensory evaluations were performed using FaceReader to capture instant facial expressions, classify valence, and calculate arousal during visual, smell, and taste testing in real-time to assess product engagement. These biometric techniques and technologies provide researchers with valuable insights into consumers' emotional responses and their impact on purchasing behavior, enhancing our understanding of the sensory aspects of product evaluation.

AFEA and FaceReader

FaceReader enables the capture of specific instantaneous reactions when individuals interact with a product for the first time (Peck & Shu, 2009). Research by Peck and Shu (2009) suggests that touching a product can evoke an immediate and automatic emotional response, influencing a person's affective reaction toward the object. Understanding these immediate emotional responses is crucial, as studies have shown that a negative impression from touch can lead to a perception of lower product quality (Lerner, Small, & Loewenstein, 2004).

Eye-tracking

Eye-tracking technology has revolutionized how researchers understand consumer behavior, as we primarily rely on our visual perception when shopping (Sorenson, 2009). By using eye-tracking glasses, researchers can track the eye movements of shoppers as they navigate through stores. Studies by Rosbergen, Pieters, and Wedel (1997) identified patterns in how individuals scan marketing materials, such as print ads or store shelves, based on the concept of visual scan paths, which examine the patterns of saccades and fixations (Norton & Stark, 1971).

Salient stimuli play a crucial role in attracting initial eye movements, significantly influencing consumer behavior (Plassman & Ramsay, 2012). Shelf visibility is an important factor in purchase decision-making, as customers are unlikely to buy a product that is not easily visible in stores. Eye-tracking is a tool for analyzing shopping behavior

by tracing the eye's path as it scans a package or shelf display. This technique provides valuable information for understanding shoppers' visual priorities (Meyers & Lubliner, 1998).

Eye-tracking allows for evaluating "visual equity," which refers to the time spent visually assessing a product and the consumer's response to specific packaging features. This data can be crucial for design planning. Eye-tracking measures various parameters, including "Time to First Fixation" (TTFF), "Area of Interest" (AOI), and "Total Fixation Duration" (TFD), providing insights into consumers' visual engagement (Tonkin, Holmes, & Hurley, 2014).

Haptic cues

Haptic cues, specifically the sense of touch, have a significant impact on consumers' perception and evaluation of products, as demonstrated in various studies. Peck and Shu (2009) examined the concept of "perceived ownership" and found that touching a product before purchase increases both the perception of ownership and the perceived value of the product. In another study, Grohmann, Spangenberg, and Sprott (2007) concluded that touch communicates the high quality of a premium product and influences product evaluation, leading to higher purchaser confidence compared to no tactile input.

Packaging, in particular, plays a crucial role in tactile perception and consumer buying behavior. Factors such as shape, texture, weight, and ease of opening contribute to consumers' attraction, approach, and product perception, influencing their decision-making (Spence, 2016). Brands utilize packaging enhancement technology to

make packages more appealing and engaging (Chauhan, 2014). Jha et al. (2020) found that people are more likely to redeem discount cards and subscribe to mailing lists when the cards are heavier and softer. Additionally, Krishna (2015) discovered that the firmness of a cup affects the perception of the beverage served in it, with firmer cups often being preferred. Therefore thicker, heavier-weight paperboard may be a “premium” packaging attribute. Touching product packages may also create taste perceptions. McDaniel and Baker (1977) compared the texture of potato chip packaging and found that packages that are harder to open are perceived as fresher and crispier. Kerpel, Kobuszewski, and Kerckhov (2020) demonstrated that glossy packaging is associated with perceptions of highly sugary and fatty foods. Milosavljevic (2012) revealed that individuals tend to prefer food items with brighter packaging, even when they may prefer the taste of alternative options. Moreover, Kampfer, Leischnig, Ivens, and Spence (2017) investigated the role of haptic perception in enhancing taste and willingness to pay, focusing on the weight of the product packaging as a primary criterion. Their results highlighted the influence of haptic cues on taste perception and consumer behavior. These studies collectively emphasize the importance of haptic cues in shaping consumer perceptions, evaluations, and decision-making processes related to products and packaging.

(Rauwers et. al. 2018) Investigated the interactivity of digital magazines with interactive ads versus non-interactive ads. It is essential to seek knowledge on interactivity with media to improvise and maximize communication.

CHAPTER 1

Methodology

The objective of this research is to examine consumer responses to packaging materials, specifically paperboard with different grades and finishes, along with their experiences, to gain insights into the strengths and weaknesses of each finish. Insights gained from pilot studies improved the methodology. The project is divided into three phases to test five hypotheses:

- Phase I(a). Assessing Treatment of Types of Mailers:
 - Participants sort five different types of direct mail into Keep, Recycle, or Trash. Their preference for each is observed and analyzed.
- Phase I(b). Assessing the Quality of Marketing Materials
 - Participants were randomly assigned to either premium or non-premium direct mail with discount codes, allowing the researchers to observe and analyze the difference in the interaction between the two different qualities of the same direct mail.
- Phase II. Assessing Packaging Quality
 - Participants were randomly assigned to premium or non-premium packaging for the earbuds they ordered online. The difference in the unboxing experience captured through their facial expressions is recorded and analyzed.
- Phase III. Assessing Packaging Finishes

- Participants shop for CBD products in a retail environment. They choose one out of four finishes provided in CBD packaging. Their interaction is recorded as Touch, Attention, and Purchase Decision to analyze correlation.

Each phase will be elaborated on in detail after the hypothesis.

Phase I(a), Hypothesis 1:

- H_1 : The Proportions of Keep, Recycle, and Trash for five types of direct mail pieces will not be equal.
- H_0 : The proportions of Keep, Recycle, and Trash for five types of direct mail pieces will be equal.

Phase I(b), Hypothesis 2:

- H_1 : The premium finished 18pt SBS marketing material with Foil stamp, and Glossy finish will have significantly more consumer interaction compared to the non-premium material.
- H_0 : There will be no significant difference in consumer interaction between premium marketing materials with a promotional code and non-premium materials.

Phase II, Hypothesis 3:

- H_1 : The unboxing experience of the 18 pt SBS premium packaged with Foil stamp, glossy printed earbuds will have significant differences compared to the 16pt CRB non-premium packaged alternative.

- H_0 : The unboxing experience of the earbuds will be consistent regardless of the packaging grade.

Phase III, Hypothesis 4:

- H_1 : Premium Finishes (Foil, Emboss, or Glossy) attract better sales when there is equal opportunity to purchase each of them.
- H_0 : All Finishes will have comparable sales when there is an equal opportunity to purchase each of them.

Phase III, Hypothesis 5:

- H_1 : The more or longer a package is touched, the more it is purchased.
- H_0 : Frequency of touch, as a parameter to predict sales, will have no statistical difference in sales compared to the duration of looking at the product.

General Screening Criteria

An email containing a link to screener questions was sent to a database of opted-in participants. The invitation mentioned the opportunity to receive a \$20 Amazon gift card upon completing the final study. Qualification for the study required passing the screener questions (Appendix A), after which participants proceeded to Google Forms to schedule their visit for the study. The target for the final experiment included 60 participants.

Experimental Design and Lab Environment (CUshop™)

The experiment was conducted in a controlled lab environment called CUshop™, which was divided into three distinct areas, each corresponding to the three phases of the study: the living room area, the unboxing station, and the retail environment. Each area was designed to simulate specific shopping scenarios and capture participant behavior for analysis.





Participants sign an Informed consent form approved by the IRB (Appendix B) and scan a QR code on their phone before entering the lab. This QR code takes them to the survey, which includes the questions and prompts for the participants. Inside the CUshop™, All the communication with the participants happens through these prompts mentioned in the survey, and that's how the participants get to know about their next step or transition to the next phase.

Phase I. The Living Room. (Figure 1) In Phase I(a), participants were welcomed into a comfortable living room environment and handed over the eye-tracking glasses. Their task was to sort the direct mail they received into three categories: “Keep, Recycle, Trash” (Figure 2). Direct mail consisted of five different types: Trifold, Catalog, Envelope, Circular, and Postcard (Table 1). The order of the main types was shuffled for each participant to mitigate any potential bias,. Additionally, to ensure that the direct mail appeared unused, it was replaced after a group of participants interacted with it. The participants' actions during the sorting process were recorded by the front-facing camera on the eye-tracking glasses.



Figure 1: Image of the living room

Table 1: Images of all the direct mail used

Name	Picture
Catalog	 <p>The image shows the cover of a magazine titled "COBB in focus". The main headline is "U.S. Energy Solutions of GA" with a sub-headline "Helping clients navigate the solar landscape". The cover features a man and a woman standing in front of a house. At the bottom, it lists services: "Health Insurance Agents • Artisan Custom Closets • Credit Union of Georgia".</p>
Circular	 <p>The image shows a circular for "Closets by Design". It features a "save" banner at the top. The main text says "Imagine your home, totally organized!". There are two offers: "40% off Free Installation" and "15% off". The contact information is "855-971-2161" and "www.closetsbydesign.com".</p>
Envelope	 <p>The image shows an envelope for "valpak". It features a Harry's razor and the text "HARRY'S GET YOUR TRIAL SET". The offer is "SIMPLY SCAN THE QR CODE OR GO TO HARRY.COM/HPAK".</p>
Postcard	 <p>The image shows a postcard for "deckworld". It features a "FREE" offer for a "FREE 30-MINUTE CONSULTATION". The contact information is "864-657-2200" and "www.deck-world.com". The postcard also includes a "postnet trend" barcode and the address "ACDW-DAL 2117".</p>

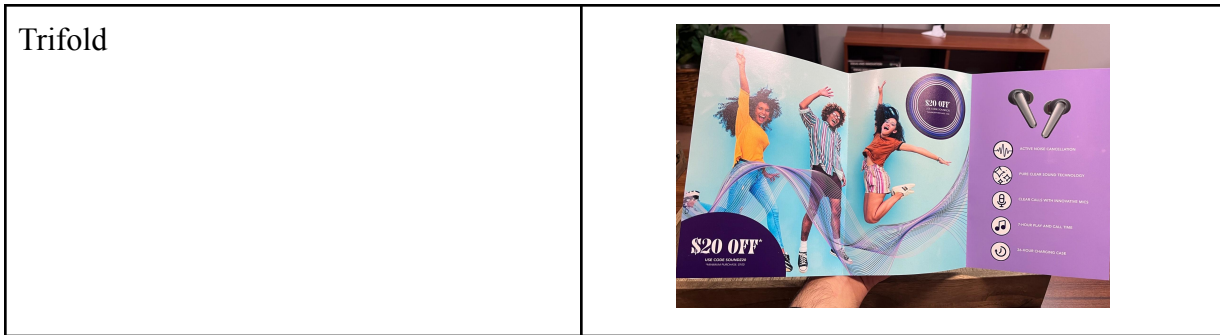


Figure 2: Image of how the participants sorted the direct mail

In Phase I(b), the Trifold mail, which contained a promotional code for discounted earbuds, was the focus of this phase of the experiment. Half (50%) of the participants received a premium(Foil and Gloss) finished trifold made of 18pt SBS paperboard, while the remaining half received a non-finished trifold made of 16 pt CRB paperboard. The participants were informed through the prompt on their phones that they were purchasing earbuds as a gift for a friend with a budget of \$110. Three alternative options for the earbuds were presented, priced at \$79, \$99, and \$119, respectively. All prompts and questions were communicated to participants via their phones (Table 2).

Upon successfully entering the promotional code, a discount would be applied to the price of the most expensive earbuds, ensuring they fit within the given budget. Throughout the process, the participants' interactions and decision-making processes were captured by the camera on the eye-tracking glasses.

Table 2: Prompts and survey questions for Phase I(b)

Survey Questions	Options
Do you have a promotional code?	Yes/No
Enter Promotional Code	Free response for the code provided. Condition: If Yes to the previous question
Please select the product of your choice	Select from three options. Condition: Can afford the most expensive option only if the discount code entered is correct.
How often do you order from a website that is featured in direct mail?	Likert Scale
How often does direct mail influence you to visit a website?	Likert Scale
How long do you save direct mail pieces that have promotion codes	Frequency scale
How often do you use promotion codes you receive from direct mail pieces?	Likert Scale
Promotional codes on direct mail influence me to purchase items online.	Strongly agree-Strongly disagree

Phase II. The Unboxing Station. The unboxing station was dedicated to the participants' unboxing experience. Detailed step-by-step instructions were provided to ensure consistency across all participants in unboxing in two stages (Figure 3&4). Half of

the participants received premium earbuds packaging made of 18 pt SBS paperboard and premium Foil and Glossy finish, while the remaining 50% received non-finished packaging made of 16 pt CRB paperboard. Participants were provided prompts and asked questions via their phones (See Table 3). Two cameras strategically placed around the station captured participants' actions (from the top) and facial expressions during the unboxing process (from the front).



Figure 3: First Impressions of the product packaging



Figure 4: Unboxing

Table 3: Prompts and survey questions for Phase II

Prompts and Survey Questions	Options
Remove the package from the mailer. Place it on the table in front of you, but Do not Slide open the box.	Prompt

Without Unboxing any further, answer the following: Based on your experience so far, how would you rate this product?	1-5 Stars
Please share your opinion, good or bad, about the packaging so far	Free response
You will now open the earbuds package but Do not touch the earbuds or the case.	Prompt
Based on your experience so far, how would you rate this product	1-5 Stars
Please share your opinion, good or bad, about the packaging so far	Free response
I have returned a product because of a negative unboxing experience	Strongly Disagree - Strongly Agree

Phase III. The Retail Store. Transitioning from the unboxing station, participants moved to Phase III, a retail store-like environment within CUshop™. In Phase (III), participants were provided with a shopping list on their phone and instructed to shop for the items without any budget limitations. The shopping list did not specify any brand names, and price tags were absent from the products in the store. Participants were specifically asked to select the most premium product within each category. The Shopping list included: Pepper, Mouthwash, Earbuds, Facial Moisturizer, Facial Cleanser, and CBD Serum.

The focus of Phase III was to examine the consumer interaction with the four types of packaging options (including Foil, Glossed, No Finish, and Embossed) in an unfamiliar category (CBD serum) in a retail setting when all of them have equal opportunity to get picked. All of the CBD products were of the same shape and size (2.25" x 2.25" x 5") and had equivalent finish surface area on the packaging to ensure consistency in the experimental conditions. Calibrated eye-tracking glasses were worn by

participants throughout the experiment, allowing their actions to be continuously monitored by the glasses' integrated camera. Participants were encouraged to touch and examine the items on the shopping list (see Table 4) to make informed judgments before purchasing (Figure 5). The interactions recorded by eye-tracking, Touch Metrics, and purchase decisions were analyzed in this phase. The other items listed on the shopping list (Table 4) were specifically used to transition participants from the unboxing station to the retail environment.



Figure 5: Image of the CBD shelf marked by the red box.

Table 4: Prompts and survey questions for Phase III

Prompts and Survey Questions	Options
Shopping List: <ul style="list-style-type: none"> - Pepper - Mouthwash - Facewash - Moisturizer - CBD Serum 	Items to purchase from the retail area

- Earbuds	
How important is touching a product and/or packaging while shopping?	Scale 1-12
One of the things you shopped for was the luxury CBD Serum. What was it about the package that gave you the perception that this was a luxury product?	Free Response

This approach of not imposing budget limitations was based on the findings of Hwang and Kim (2021), who discovered in their study that price consciousness has a conditional relationship with the level of interaction with products in a retail environment. By removing budget constraints, participants could freely engage with the products without being influenced by price considerations, providing a more accurate understanding of their preferences and behaviors.

To ensure a conducive research environment, the CUshop™ was carefully set up, and unwanted noises were minimized to create a quiet environment conducive to concentration. Consistent and flicker-free lighting was maintained throughout the lab, providing reliable illumination for accurate observation and analysis of participant behavior.

Participants

A total of 60 participants were selected from individuals who qualified for the screener process. All participants were recruited from upstate South Carolina. 53% of the participants were between the ages of 18 and 30, 18% were between the ages of 31 and

40, 18% were between the ages of 41 and 50, and the remaining 10% were above the age of 51. Among the participants, 73% identified as female, while 27% identified as male.

All participants indicated that they made online purchases at least once a month. 97% of the participants reported purchasing at least one skincare product from a physical store within the past six months, while 92% reported purchasing at least one skincare product from a different brand than the one they had previously used during the same time period. When asked about the influence of promotional codes on direct mail pieces, 36.7% of participants indicated they are influenced to make online purchases by such codes, while 33.3% disagreed with the statement, and the remaining 30% of participants indicated promotional codes had a neutral effect on them.

Materials

Hardware

Tobii Pro Glasses 3. a wearable eye-tracking device equipped with 16 illuminators and 4 eye cameras. This device recorded participants' eye movements and gaze patterns throughout Phases I & III. The integrated cameras captured what participants were looking at, and the recorded video could be viewed in real-time using the Glasses 3 software on a desktop screen. The video served as a source for eye-tracking data. Before each recording session with a new participant, the glasses required calibration. The eye-tracking data was stored on an SD card attached to the eye-tracking gear. Participants were instructed to stand at a designated spot and focus their gaze on a calibration card affixed to the wall in front of them. The distance between the card and

the participants' eyes was maintained between 0.5 to 1 meter. The researcher initiated the calibration process by pressing the calibrate button on the Glasses 3 software. Successful calibration ensured optimal gaze estimation algorithms and accounted for individual variations, resulting in a customized and accurate gaze point calculation for each participant.

Noldus FaceReader 9.0 was used to measure and analyze the real-time facial expressions of the participants. This tool was employed specifically during the unboxing experiment, where participants unboxed the packages they received at the unboxing station. Facial expressions serve as a direct means of communication and can provide insights into participants' emotions, which can influence consumer decision-making. The software captured facial expressions at a rate of 30 frames per second and recorded them as numeric entries for each emotion (Happy, Sad, Angry, Disgusted, Surprised, Scared, and Neutral). The data collected was then imported into an Excel file.

Qualtrics Online Survey. Qualtrics was utilized to gather participants' responses throughout the activities through a survey that was accessed via the participant's mobile phones. Additionally, the survey served as a means to deliver consistent instructions to participants, guiding them seamlessly between different activities. By using this medium, potential bias arising from changes in wording or tone from the researchers was minimized, ensuring a standardized experience for all participants. Furthermore, the survey included an "online store" used in Phase I (b) with a seamless transition between tasks, questions, and prompts.

Microsoft Excel was employed to manage and categorize the data collected during the unboxing process. During the unboxing phase, classified as “Unpacking Shipper” and “Unboxing Earbuds,” were defined, and data imported into Excel files were manually organized accordingly for each participant.

JMP Statistical Software. Developed by the SAS Institute, JMP served as the primary data analysis software. JMP provides a comprehensive suite of statistical analysis tools, data visualization capabilities, and predictive modeling techniques.

Material Specifications

The following section provides detailed specifications for the product marketing and packaging materials used in the experiment, including the trifold mailer, earbuds package, and CBD serum.

Paperboard materials. Throughout this study, there were two different paperboards employed. Solid Bleached Sulfate (SBS) is referred to as the “Premium” paperboard, and Coated Recycled Board (CRB) is referred to as the “Non-Premium” paperboard. Specifically, the SBS paperboard was 0.018 inches thick (18pt caliper) and coated, marketed as Sappi Spectro C1S. The CRB paperboard used was 0.016 inches thick (16pt caliper). From a visual comparison, the CRB paperboard has a slightly dull shade and a rougher surface compared to the SBS, with a visible difference in print.

Trifold. (Figure 6) The Trifolds used in the experiment feature the design of an original earbuds brand and include a promotional discount code. Two variations were

developed: Premium and Non-Premium. The Premium Trifold was made from an 18pt Solid Bleached Sulfate (SBS) substrate and incorporated embellishments such as Foil and Gloss. The Non-Premium Trifold is made from a 16pt Coated Recycled Board (CRB) substrate.



Figure 6: Non-Premium Trifold (Left), Premium Trifold (Right)

Earbuds Package. Among the participants, 30 received earbuds with premium outer packaging, while the remaining 30 received non-premium packaging. The Premium packaging is constructed from an 18 pt Solid Bleached Sulfate (SBS) substrate and features embellishments like Foil and Gloss. On the other hand, the Non-Premium packaging is made from a 16 pt Coated Recycled Board (CRB) substrate. Each earbuds package contained identical earbuds, regardless of the packaging. The design of the package aligns with the Trifold design theme.



Figure 7: Premium Earbuds Package (Left), Non-Premium Earbuds Package (Right)

CBD Serum (Figure 5). On the shelf, there were 12 CBD serums available, organized within three distinct brands offering four variants, with an aim to provide the participant with a variety of options to make a selection. The four variants included one of each of the finishes studied (Foil, Glossy, Embossed, and No Finish). As. Foil, Glossy, and Embossed variants were printed on premium 18 pt SBS paperboard, while the No Finish variant was printed on recycled 16 pt CRB fiberboard. All finished variants have an identical surface area of finish on the paperboard. All of the CBD serum brands were of the exact same dimensions and contained the same listed amounts of ingredients. To prevent any sequential bias, the sequence of CBD products was shuffled while all products were positioned on the same shelf level.

Measurement Technologies

The technologies employed to analyze participant behavior include Eye-Tracking, AFEA (Automatic Facial Expression Analysis), and Touch Metrics.

Eye-Tracking. Eye-Tracking technology was utilized during the direct mail distribution activity to capture cognitive data like what the participants looked at, how long they looked at it, and what was the order of looking at the items, which may not be easily captured otherwise. This technology enables the tracking of participants' eye movements and attention, providing insights into their interests. Specifically, the eye-tracking glasses from Tobii were used to assess the following parameters based on the company's guidelines

(Tobii Pro Glasses 3 | Latest in Wearable Eye Tracking, n.d.):

In evaluating the effectiveness of product packaging, several key factors were considered. Visibility, refers to the product's ability to stand out on the shelf. Findability, assessing how easily the shoppers could locate each design. Communication, determining the attention given to the branding and messaging (like Discount code). Appeal, Capturing consumer perception and opinions (like sorting to keep, recycle, or trash). Finally, Purchase intent reflects participants' inclination to purchase the product. The metric used to assess participant behavior in this context is Total Fixation Duration (TFD). TFD represents the total time a participant fixates on a specific Area of Interest (AOI). AOIs, which must be defined prior to eye-tracking analysis, were manually defined in the Tobii Pro Lab software. These AOIs were exclusively focused on the Trifold, the item of interest in this phase of the study.



Figure 8: Tobii eye-tracking glasses (Tobii, nd)

AFEA (Automatic Facial Expression Analysis). The AFEA metric was employed during the unboxing activity in Phase (II). Participants' unboxing videos were captured using FaceReader 9.0 software, which simultaneously analyzed their facial expressions. The camera was positioned directly in front of the participants to ensure seamless data collection during the activity. While participants were instructed to minimize head movements, some distortions in the captured data may occur, like facial misalignment to the camera, blocking the camera's vision through hands or package due to their free movements. This was manually removed from the recording by the researchers for maximized outcome accuracy.

The software categorizes facial expressions into basic categories such as Happy, Sad, Surprised, Fear, Disgusted, and Angry. An additional category, Neutral, was not considered for this research, as the focus was comparing positive and negative emotions

during the stages of unboxing. This software provides numeric and graphical representations of the intensity of the expressions captured in each frame, ranging from 0 to 1. The expression that was dominant in a particular frame is assigned the highest fractional number.

Touch Metrics. Touch Metrics encompass a predefined set of actions determined by the researchers to assess participants' interactions. These metrics include actions such as Feel, Pick up, Compare, and Put in Cart (Table 5). Although the study recorded all metrics listed in Table 5, the research team found significance in Touch Duration and the Number of Touches when comparing CBD SKUs.

Table 5: Types of touch defined

Name	Picture
Feel	 <p>The image shows a close-up of a hand reaching out to touch one of several small, rectangular product boxes on a perforated metal shelf. The boxes are red and white, with the 'M' logo and various product names like 'MILK', 'ALMOND EXTRACT', and 'PEPPERMINT' visible. Below the shelf, the tops of several cans are visible.</p>

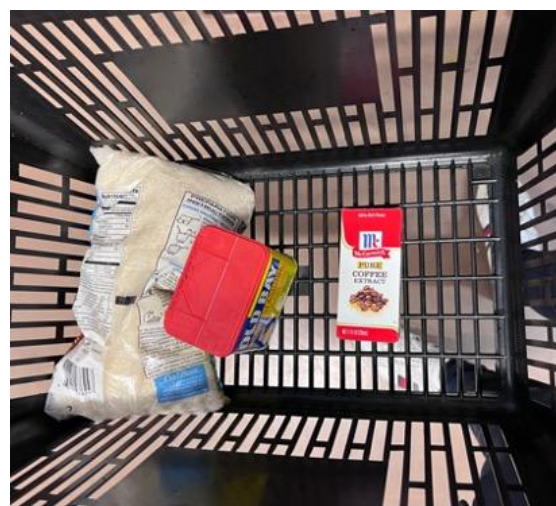
Pick up



Compare



Put in Cart



Statistical Analysis

Chi-Squared. Chi-Squared tests were used to determine if there were significant changes in **proportions** across different packaging types and products.

T-Test and ANOVA. T-Tests and Analysis of Variance (ANOVA) were used to determine if there were significant changes in means across different packaging types and products. The T-test was used to compare means for two packaging types or products, and ANOVA was used to compare means for more than two packaging types or products. (Mishra et al., 2019)

Correlation and Regression. Correlation and Regression Analyses were used to determine if there were significant changes in means across a continuum of packaging types and products.

All statistical analyses were performed using JMP. P-values less than 0.05 were considered evidence of statistical significance.

Areas of Improvement

Demographics: Because absence of heavy facial hair was a screener requirement (criteria of Facereader software), the researchers assume this influenced the gender of the population (Female 73%; Male 27%). Additionally, this study did not consider participant income. These demographic attributes could influence the data presented.

Nature of the study: For the retail shopping activity, participants were provided with a shopping list (Table 4). Before the activity, participants were instructed to purchase the most premium product. A budget or product pricing was not communicated in the

retail shopping activity. Therefore the product selected by the participant is representative of a possible perception of “most premium.” Because participants did not have an option to not purchase something on the list, it may be possible that participants found none of the options to be premium, which may influence the results.

CHAPTER 2

RESULTS & DISCUSSION

The purpose of this research is to examine and understand the complex responses of consumer decisions in relation to packaging materials and user experiences. The findings and insights gained from this study will be presented in detail in this chapter.

Findings on Phase I: Outcomes from Sorting Types of Direct Mail

The raw data for this study was collected through videos captured by eye-tracking glasses. The biometric data, specifically Total Fixation Duration (TFD), was extracted and transferred to an Excel file. The participants' actions were recorded and documented in an Excel file. Data analysis was conducted using JMP, and chi-squared analysis was performed to examine the distribution patterns of each mail piece among the three categories: Keep, Recycle, and Trash (see Table 6 for counts).

Table 6: Contingency Table

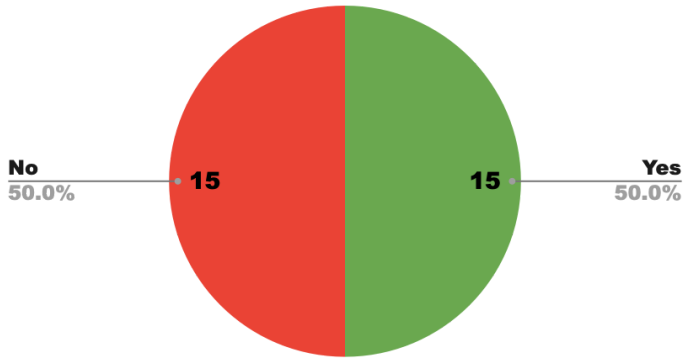
	Keep	Recycle	Trash	Total
Postcard	2	39	19	60
Circular	6	43	11	60
Envelope	18	26	16	60
Catalog	23	22	15	60
Trifold	25	17	18	60
Total	74	147	79	300

The table depicting the distribution of the five direct mail pieces reveals that trifold mail had the highest preference, with 41.7% of participants choosing to keep it, surpassing all other types of mail. The catalog mail followed closely behind at 38.3%. On the other hand, postcards were discarded by 43.3% of participants. Most interesting to the researchers was that the circular mail was recycled by a significant majority (71.7%) of participants, surpassing all other direct mail options (95% CI, $P < 0.0001$). These results highlight distinct preferences and behaviors among participants regarding the different types of direct mail.

A Chi-square distribution analysis was conducted to examine the relationship between the type of direct mail and its categorization (Keep, Recycle, Trash). The obtained Chi-square value of 43.63 with 8 degrees of freedom ($\chi^2(8) = 43.63$, $p < 0.0001$) exceeded the critical value of 15.51 at a significance level of 0.05. Thus, the null hypothesis was rejected, providing statistically significant evidence of a preference for specific direct mail pieces to be placed in each category.

Hypothesis 2 (Phase I(b)) examined the interaction with the trifold, specifically focusing on attention as measured by Total Fixation Duration (TFD), successfully entering the code, and opening the trifold. Among these defined actions, only the act of opening the trifold was found to be statistically significant. The analysis conducted using a t-test revealed a significant difference ($p = 0.0041$) in the opening of Premium Trifolds (Figure 9) compared to Non-premium tri-folds. Thus, the null hypothesis, assuming equal treatment of all trifold variants, was rejected.

Trifold open? Non Premium Trifold



Trifold open? Premium Trifold

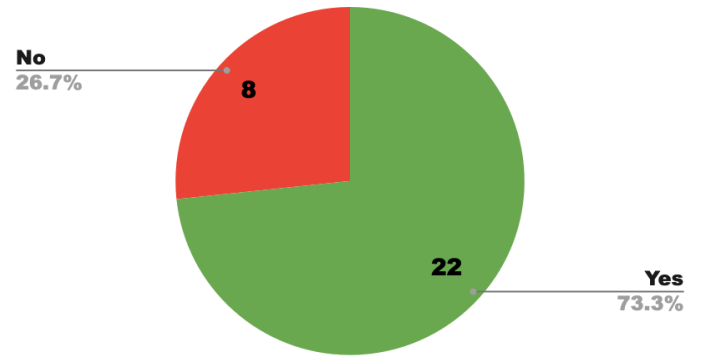
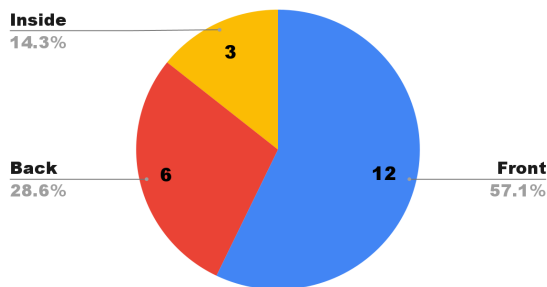


Figure 9: Consumer Interaction with Trifold

In addition to the hypothesis, we also observed that the entry of the discount code differed depending on the side of the trifold. Specifically, we found that the discount code entry from the front of both the premium and non-premium trifolds was utilized twice as much compared to the entry from the back and four times as much compared to the entry from inside (see Figure 10).

Premium Trifold



Non-premium Trifold

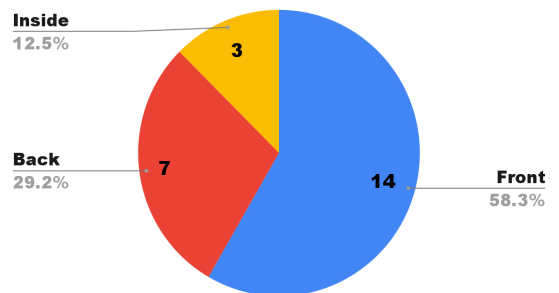


Figure 10: Discount code entry from each side of the premium and non-premium trifold
According to the survey results, 48% of respondents reported that they do not use promo codes featured in direct mail, while 33% indicated that they do utilize them. Interestingly,

only a small percentage of respondents stated that they "always" use promo codes (see Figure 11).

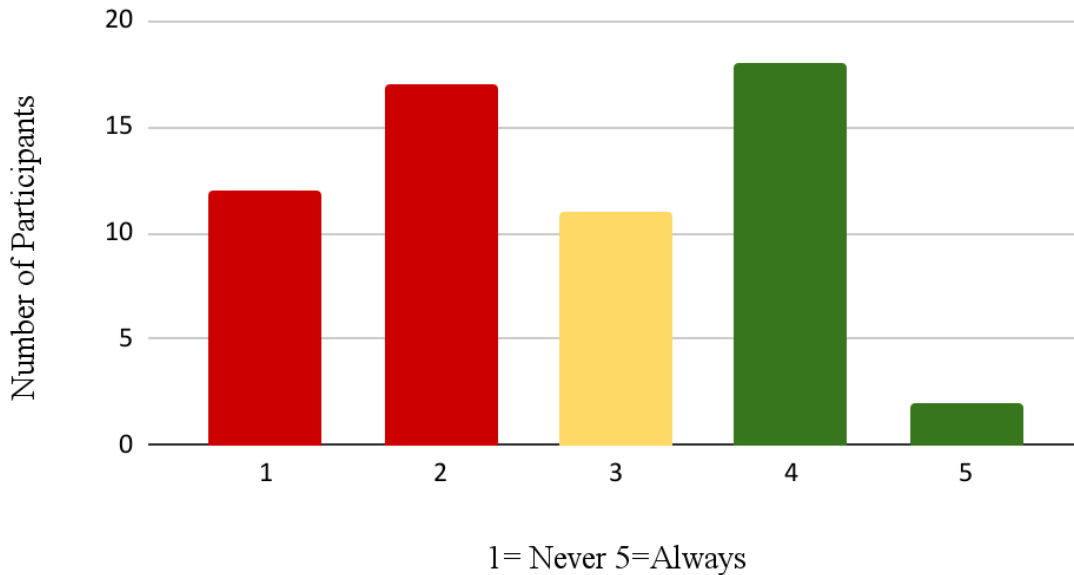


Figure 11: Survey question: How often do you use promo codes featured in direct mail

Based on the survey responses, participants were asked to rate on a Likert-type scale ranging from "Never" (1) to "Always" (5) how often direct mail influences them to visit a website. The data analysis revealed that the mean score across all participants was leaning toward Negative (Mean = 2.5) (see Figure 12). This suggests that, on average, direct mail has a moderate influence on participants' decision to visit a website.

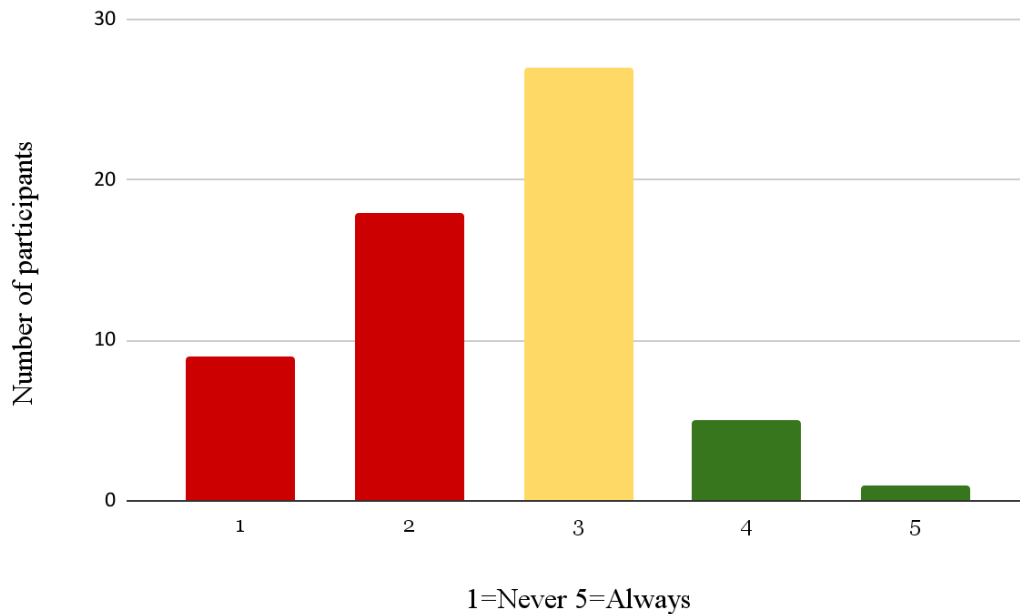


Figure 12: Survey question: How often does direct mail influence you to visit a website?

Participants were asked about their confidence in using promotional codes from direct mail pieces to make online purchases. In response to the question, "Do promotional codes on direct mail influence you to purchase items online?" The findings show that there is almost an equal distribution among the participants' responses (see Figure 13). Approximately 33.3% of participants indicated that they do not feel influenced by these codes, while 36.7% reported that the promotional codes influence their purchasing decisions. The remaining 30% of participants responded with a neutral stance, neither agreeing nor disagreeing with the influence of promotional codes on their online purchasing decisions.

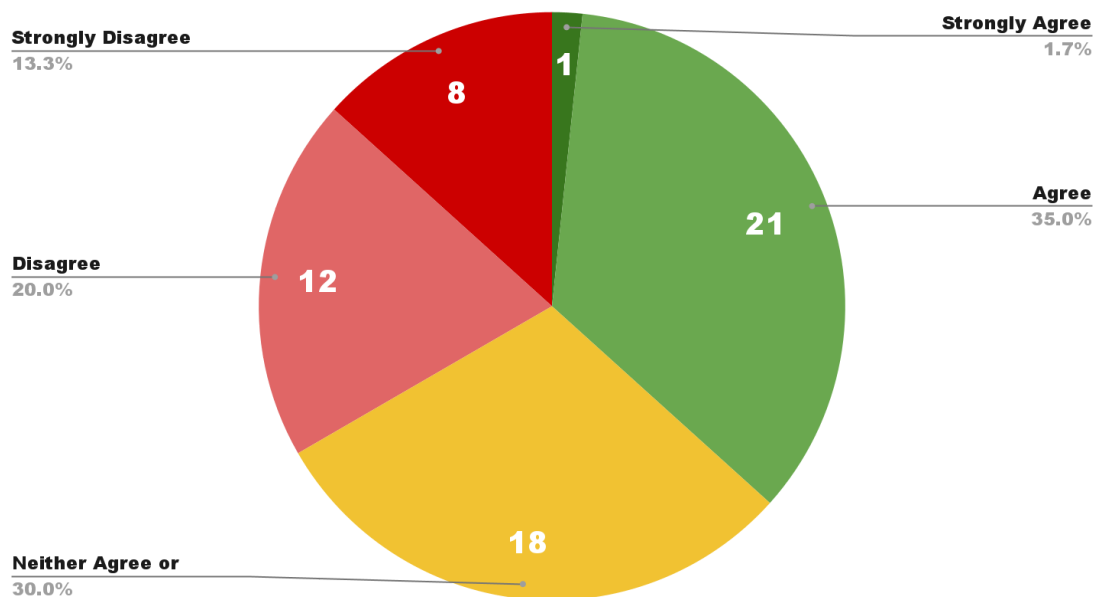


Figure 13: Survey question: Promotional codes on direct mail influence me to purchase items online.

Participants were asked about their habits of saving direct mail pieces to take advantage of the promotion codes included. When asked the question, "How often do you save direct mail pieces to use the promotion codes?" it was observed that smaller percentages of participants either do not save the mail pieces at all (20%) or save them for an extended period of time, specifically several months (13.3%). However, most participants exhibited a different trend, with 33.3% saving the direct mail pieces for a few days and another 33.3% saving them for a few weeks (Figure 14). These results indicate that while a portion of respondents either do not save the mail pieces or hold onto them for a longer duration, a significant number of participants opt to save them for shorter periods, typically ranging from days to weeks

Saving direct mail pieces

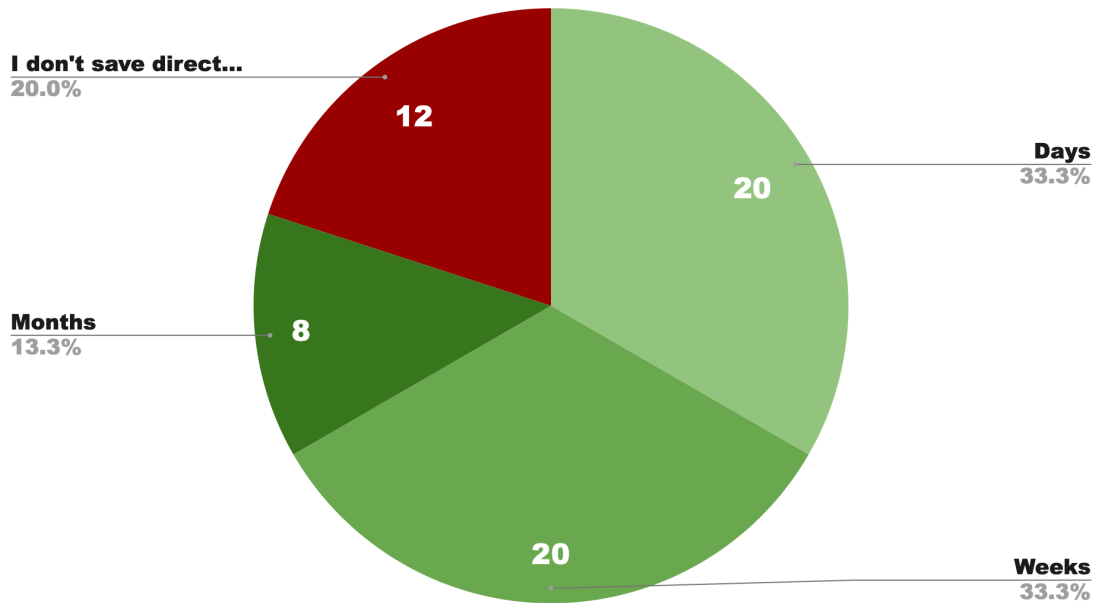


Figure 14: Survey question: How often do you save direct mail pieces to use the promotion codes?

The first phase of the study aimed to investigate how adults interact with direct mail and their perceptions of recyclability. The findings of this phase have significant implications for organizations that utilize direct mail as a communication tool to reach their target audience. Teufel (1991) emphasized the importance of encouraging consumers to recycle direct marketing materials in their research. The present study's results provide empirical evidence that can guide companies in designing direct mail materials that are more aligned with consumer behaviors and preferences regarding recyclability. When assessing the effectiveness of direct mail in terms of customer

interaction, among the five direct mail types, Trifold demonstrated the highest retention rate. Findings suggest that Trifold design holds significant potential for enhancing customer engagement.

Understanding consumer behaviors and preferences related to recyclability enables organizations to optimize the recycling process and leverage customer information to promote responsible recycling practices. In this study, the circular was recycled more than all the other direct mail studied, even though all of the direct mail pieces were 100% recyclable. More research is needed to understand this, but the researchers hypothesized that the fact that the appearance of the direct mail, especially the printing and type of substrate used (premium or non-premium), will guide the decision-making of how the direct mail piece is interacted with. These findings can have practical implications for organizations seeking to enhance their environmental sustainability efforts while effectively engaging their target audience through direct mail campaigns. Furthermore, future research could focus on identifying best practices for encouraging and maximizing recycling at the domestic level, further contributing to the knowledge base in this area.

The findings of the direct mail study revealed a preference for premium direct mail among participants, indicating its impact compared to the non-premium counterpart as more participants had opened the premium trifold to interact with it compared to the non-premium one. Notably, participants showed a stronger inclination to engage with the

front side of the direct mail when referencing the promotional code. These findings provide valuable insights for marketers aiming to optimize their direct mail campaigns by leveraging premium finishing techniques on direct mail aimed towards maximum interaction with it for a promotional cause. Additionally, printing the most valuable content on the first page of the direct mail is the most effective, according to the learning from this study.

Furthermore, the study identified limitations in the previous suggestion made by Teufel (1991) regarding replacing promotional mail printed on virgin fiber with recycled paperboard as both were stated to have similar outcomes. The results in this study (Phase I(b)) demonstrated that interaction with premium direct mail surpassed the non-premium alternative, with more participants actively opening and engaging with different sides of the premium trifold compared to the non-premium trifold. For future research, it would be beneficial to compare different types of direct mail, all developed with the exact same material and featuring the exact same printed discount code, in order to quantify the variations in interaction among the various types of direct mail. Such data could aid in optimizing both recyclability and consumer-level interaction.

Findings on Phase II: Outcomes from Unboxing Experience

The data obtained from the unboxing experience of the earbuds was analyzed in terms of the basic expressions of Positive or Negative as described earlier in methodology (under Noldus FaceReader 9.0). In order to compare the positive and negative experiences

associated with the different packaging types, the expressions of Happy and Surprised were combined to form positive expressions, while Angry, Sad, Scared, and Disgusted were combined to form negative expressions. The following figures compare the mean positive and negative expressions between participants who received non-premium packaging and those who received premium packaging during the Unpacking and Unboxing stages.

Figure 15 demonstrates statistically significant differences in both positive and negative expressions during the unpacking stage between non-premium packaging means. Student's t-test was performed to confirm the statistical significance, revealing a p-value of < 0.0149 for positive expressions and a p-value of < 0.0254 for negative expressions. This provides valuable insights into the unboxing experience of earbuds, indicating a more positive experience with premium packaging and a relatively lower negative experience compared to non-premium packaging. As a result, null hypothesis 3 is rejected (Figure 15).

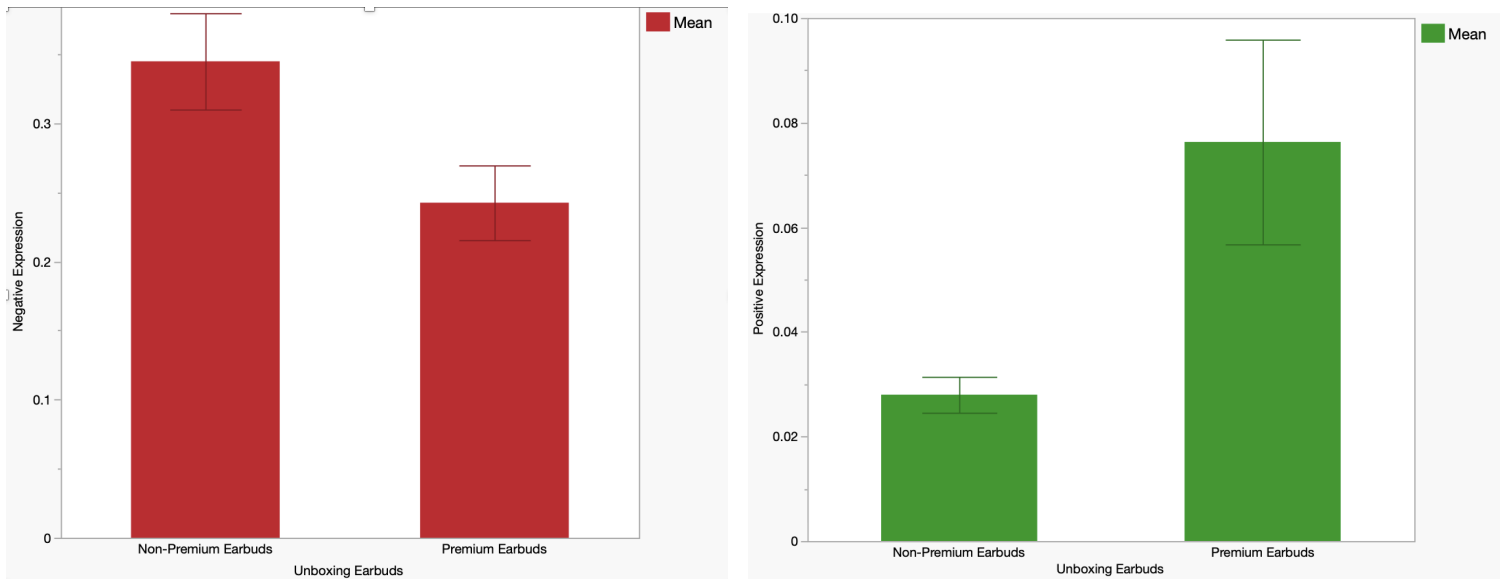


Figure 15 - Facial expression while unboxing Earbuds

According to the survey results for the question "How would you rate this product?" (First Impression), participants were asked to rate the product using a rating scale of 1 to 5 stars. For non-premium packaging, the average rating was 3.5 stars, and 3.9 stars for premium packaging.

Participants were similarly asked to rate the product after unboxing, using the survey question "How would you rate this product?". The average rating for products with non-premium packaging was 3.8 stars, while for product with premium packaging, the average rating increased to 4.0 stars.

When participants were asked, "I have returned a product because of a negative unboxing experience," on a scale of agreeableness, a big portion of participants (68.3%) indicated

that they would not return a product due to a negative unboxing experience. However, it is worth noting that 18.3% of respondents did express the possibility of returning the product in the event of a negative unboxing experience, and the remaining 13.4% of participants had a neutral response.

The second phase of the study focused on analyzing the effectiveness of premium finished electronics product packaging compared to non-premium alternatives. The analysis using AFEA yielding an intriguing finding in this phase suggests better customer satisfaction with unboxing the product can be achieved with premium packaging compared to the non-premium alternative. The observation carries significant implications for packaging developers for Direct-To-Consumer companies highlighting the importance of optimizing a consumer unboxing experience which can be achieved by making the packaging more premium.

Additionally, these findings suggest that due to a negative unboxing experience, there is still 18.3% who consider the unboxing experience as a factor in their decision to return a product, and improvising on just the packaging could reduce the returns of the products for the company on the e-commerce channels.

Findings on Phase III: Outcomes from Retail Shopping for CBD

In relation to hypothesis 4, the study collected data on participants' purchase of items and the corresponding behaviors. Attention was measured by assessing the total fixation duration (TFD) on the specific product of interest. Each product of interest was designated as an Area of Interest (AOI) and tracked using eye-tracking software to determine TFD. Additionally, touch interactions were examined, specifically Touch Duration and Number of Touches, as indicators of participants' engagement with the products. These variables were recorded for each participant in the study.

Figure 16 illustrates the purchase frequency of the CBD serum, with participants expressing their preferences for different finishes. The majority of participants showed a preference for the Foil finish compared to other finishes. Moreover, a significant finding emerged from the chi-square analysis, indicating a P-value of 0.0001. This result indicates that, even when given an equal opportunity to purchase, the Foil finish was preferred over other finishes. Consequently, the null hypothesis is rejected, suggesting that there is a significant association between the choice of finish and the participants' preference for the CBD serum.

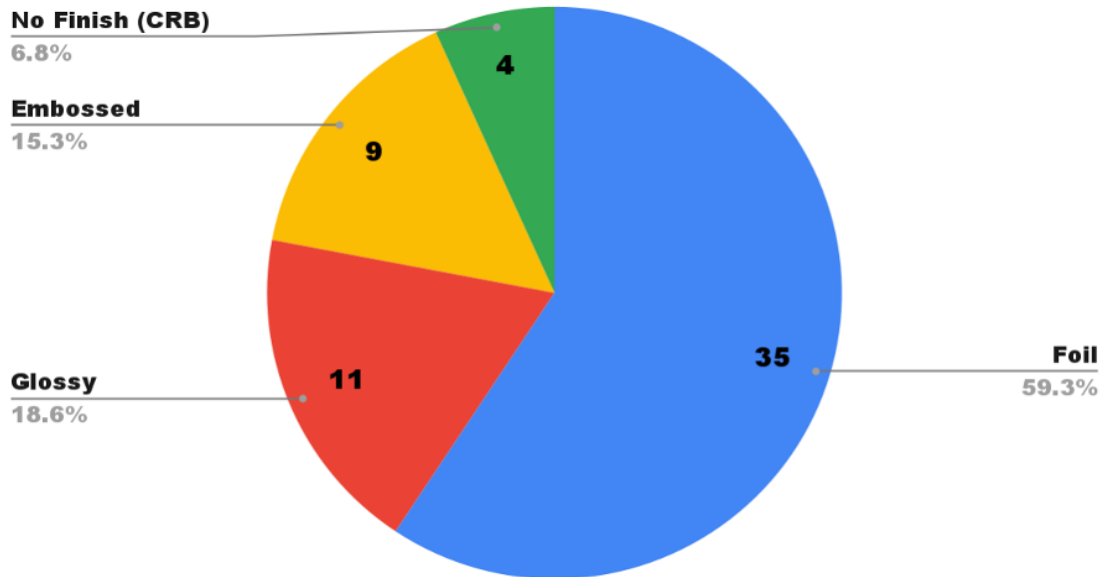


Figure 16: Purchase Frequency of each finish of CBD serum

To test the hypothesis, a correlation model was created to examine the relationship between actions (Touch Duration, Number of Touches, and TFD) and purchase behavior. Each finish was analyzed individually to determine the correlation with the actions performed. The results revealed positive correlations between each parameter and purchase. To identify the action with the strongest correlation, a multiple regression model was employed. The analysis showed that the Number of Touches exhibited the strongest correlation with purchase across all finishes. This finding was supported by the statistical significance of the correlations for each finish, with Foil ($P = 0.002$), Glossy ($P = 0.006$), Embossed ($P = 0.007$), and No Finish ($P = 0.028$). Consequently, the null

hypothesis was rejected, indicating a significant association between the Number of Touches and purchase behavior.

Biometric data analysis is crucial as it provides more reliable insights compared to relying solely on survey data. In this study, participants were asked to rate themselves on a Need For Touch Scale during a retail purchasing experience, where a rating of 1 indicated minimal importance given to touch, while a rating of 12 indicated that touch was indispensable in their purchase decision-making process. Figure 17 and Figure 18 present the variations in touch performance among participants based on their self-ratings on the Need For Touch Scale. Touch was found to be related to product selection. For some finish types, “number of touches” and “touch duration” were found to individually be significant.

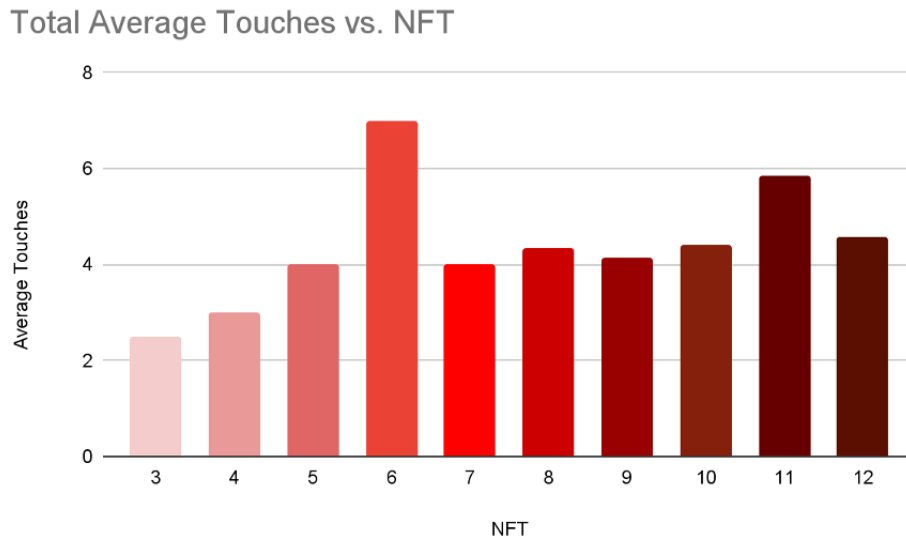


Figure 17: Participants performed average number of touches on CBD when they rated themselves from 1-12 on Need For Touch scale.

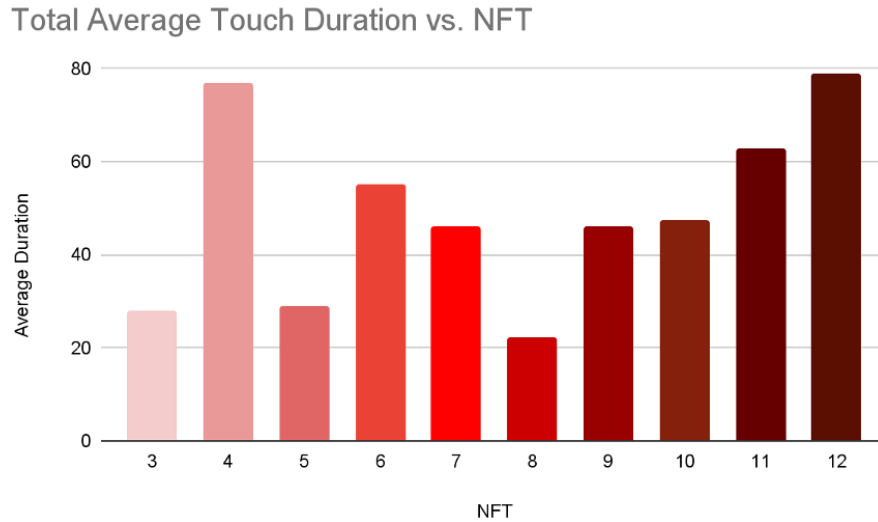


Figure 18: Participants performed average touch duration on CBD when they rated themselves from 1-12 on Need For Touch scale.

To measure the relationship of the probability of product selection and three important parameters (Total Gaze Fixation Duration, Touch Duration, and Number of Touches), researchers developed and estimated a simple linear regression models for each parameter individually (Appendix C). Note that these simple linear regression lines were developed for each type of CBD product finish. To measure the relationship of probability of product selection and the three parameters simultaneously, researchers developed and estimated a multiple regression model (Appendix D). Each of the models have estimates of the relationship between the probability of product selection and the

three parameters (denoted as “Parameter Estimates.”) It was found that both touch and number of touches have positive correlations with product selection.

Phase III of the study highlights the importance of Touch as an element in consumers’ decision-making process in a retail environment. These figures provide valuable information regarding the role of touch in influencing consumer behavior and highlight the importance of incorporating biometric data analysis, specifically on touch to purchase, to gain deeper insights into the decision-making process. The key outtakes from this phase are that the consumers were attracted the most to the Foil stamped package compared to other embellishments when compared side by side. From the graphs of the NFT scale, we learned that participants prefer touching the product while purchasing. Finally, when comparing touch to attention, touch is a dominant predictor of sales. In other words, the more the purchaser touches the product, the higher the chances of them picking up that product to purchase it. When combining the learning from Phase III, it can be suggested that companies should add touch elements to the premium packaging in order to increase the probability of the product getting picked in an unknown category, and Foil finish can be a better alternative compared to the Embossed, Glossy finish, or non-finished product packaging in terms of getting picked in the retail environment.

CHAPTER 3

CONCLUSION

Packaging plays a critical role in product marketing, yet its significance is often overlooked. Businesses face the challenge of determining the return on investment for premium packaging features, considering the wide range of available substrates and finishes available. While previous studies have examined design elements such as size, shape, color, and font and their impact on consumer attraction and sales, limited research exists on the influence of touch on product packaging and its effect on product selection.

The present study represents an investigation into consumer responses to premium packaging in various scenarios, encompassing interactions with unfamiliar product categories in retail environments, online product unboxing experiences, and direct mail. According to the Mintel Report "State of Retail & E-commerce (2023)," the escalating challenge of returns faced by retailers is apparent. In 2022, consumers were projected to return over \$816 billion worth of goods, representing a 7% increase from the previous year. This upward trend in returns poses significant financial losses for companies operating in the retail industry.

This study employed a mixed-methods approach to data collection, including surveys, eye-tracking technology, touch analysis, and facial expressions analysis. Participants were engaged in multiple activities where behavioral data was collected. Through this, a deeper understanding of packaging's role in consumer engagement and

product selection emerges. It should be noted that gender distribution, income level, and a forced selection task influences the data collected, so further interpretations and future studies should make note of these limitations.

Touch is identified as a crucial factor in driving consumer behavior and purchase decisions in physical retail environments, underscoring the importance of tactile experiences in the decision-making process. The type of touch is further categorized into four actions, out of which consumers would generally perform at least one of the actions while retail shopping, which is, Feel, Pick up, Compare, and Put in the cart. A simplified process of measuring touch duration and counting the number of touches was found to positively correlate with purchase decision. The study establishes the number of touches as a more significant factor than the visual response in product selection across different packaging finishes, including foil ($P = 0.002$), glossy ($P = 0.006$), embossed ($P = 0.007$), and no finish ($P = 0.028$). Companies can leverage this information by adding touch elements to the product packaging and expect better results in engagement and product selection. Foil finishing showed significantly more shopper engagement over gloss and emboss tactics for the CBD category. The results also indicate that premium packaging may generate higher levels of consumer engagement and elicit more positive responses in both retail and at-home settings as seen in the earbud electronics unboxing.

Consumer perceptions of recyclability regarding different types of direct mail were also investigated. The findings revealed that circular direct mail is widely perceived

as recyclable, while postcards are more likely to be discarded in the trash. However, all of the direct mail tested was equally recyclable, so there is a gap between the reality and consumer perceptions of direct mail paper recyclability. In this study, the prominent placement of discount codes did result in an increased duration of consumer engagement on the codes. Companies can incorporate this knowledge by utilizing Trifolds as a better alternative compared to other direct mail options (Catalog, Envelope, Postcard, and Circular) to achieve increased consumer engagement with marketing material.

Furthermore, premium packaging evokes more positive facial expressions in the context of earbuds compared to non-premium packaging. While this study has provided valuable insights, it is important to acknowledge its limitations. The relatively small sample size of participants may limit the generalizability of the findings. Future research should investigate if the findings apply to categories beyond CBD, earbuds, and direct mail.

In conclusion, this research underscores the significance of premium packaging in capturing consumer attention, driving engagement, and influencing product selection. By leveraging these insights, businesses can optimize their packaging designs to enhance consumer experiences and achieve their marketing objectives more effectively. Integrating touch, visual stimuli, and recyclability considerations further supports the importance of optimizing packaging designs to enhance consumer experiences and promote sustainable practices. With the increasing market competition, companies

prioritizing packaging as a strategic tool can differentiate themselves, foster brand loyalty, and ultimately drive sales and business success.

APPENDICES

Appendix A
 Screener Survey

Tools ▼ Saved Apr 11, 2023 at 1:35 PM Draft

Q Preview Publish

SAPPI Screener

ExpertReview score Great

Default Question Block ⋮

Page Break

Q1 ☆ ⋮

⋮ 🔗 Skip to

End of Block if Yes Is Selected

Do you have heavy facial hair?

Yes

No

Page Break

Q2 ☆

⋮ 🔗 Skip to

End of Block if Yes Is Selected

This study requires you to not wear glasses, Do you need to wear glasses?

Yes

No

Page Break

Q3 ☆

⋮ 🔗 Skip to

End of Block if Less than once a month Is Selected

How often do you shop online?

2-3 times a week

Once a week


Once every two weeks

Once a month

Less than once a month

Page Break

Q4 ★

▼  Skip to

End of Block if No Is Selected


Are you a primary shopper for majority of items you consume?

Yes

No

Page Break

Q5 ★

▼  Skip to

End of Block if Yes Is Selected


Do you study or teach marketing or consumer research?

Yes

No

Page Break

Q6 ★

▼  Skip to

End of Block if No Food Allergies or Object... Is Not Selected

Do you have any allergies or objections to eating or tasting the following items?
(Select all that apply)

- No Food Allergies or Objections
- Dairy (Milk/Cheese/Yogurt)
- Snacks (Fritos/Cheetos/salted chips)
- Dark Chocolates
- Nuts (Tree nuts, peanuts)
- Eggs
- Soy
- Wheat products
- Salt

Page Break

Congratulations! You are eligible for the study. You are required to enter your email address and select a date and time suitable to you.

Be sure to add that to your calendar. This study would take about 25 mins and you will be compensated \$20 at the end of the study for your time.

Page Break

Q7 ★

Please enter your email address

▲ 📄 Import from library + Add new question

Add Block

▼ Block 4

💡

We're sorry you don't qualify for the survey.

▲ 📄 Import from library + Add new question

Add Block

End of Survey

We thank you for your time spent taking this survey.
Your response has been recorded.

Appendix B

IRB Informed Consent

Tools ▼ Saved Nov 2, 2022 at 5:41 PM Published Q Preview Publish

SAPPI Informed Consent and Media Release ExpertReview score Fair

Default Question Block ⋮

Q1 ⋮
The following questions ARE NOT connected with the results of this experiment. You will receive a unique Participant ID code after consenting to this research experiment which will be use to identify you. There is no connection between your name and your Participant ID code.

Q2 ★
What is your name?

Q3 ★
What is today's date (MM/DD/YYYY)?

Q4 💡 ★
**Information about the Research Study
Clemson University**
Shopper Research at CUshop

KEY INFORMATION ABOUT THE RESEARCH STUDY
Dr. R. Andrew Hurley is inviting you to volunteer for a research study. Dr. Hurley is an Associate Professor at Clemson University conducting the study with Sahil Bhayani, graduate student.

Study Purpose: The purpose of this research is to better understand the impact that packaging has on human behavior

Voluntary Consent: Participation is voluntary, and you have the option to not participate.

Activities and Procedures: Your part in the study will be to interact with various products

and content (mail, candy packaging, and retail shopping) while wearing eye-tracking glasses or having a camera record your facial expressions. You will also be tasting various chocolates and providing feedback on the flavor and the packaging. You will use your personal device to answer survey questions from an online source.

Participation Time: It will take you about 20-30 minutes to complete this study.

Risks and Discomforts: There are certain discomforts that you might experience if you take part in this research. They include feelings of discomfort while being recorded and wearing eye-tracking glasses. Review the equipment/devices section for details about the types of equipment that will be used in the study. You will be allowed to take breaks to rest and you may quit the research at any time without penalty.

Possible Benefits: You may not benefit directly from participating in the study. Potential research benefits include a greater understanding of how product design impacts behavior.

EXCLUSION/INCLUSION REQUIREMENTS

Participants must be primary or shared household shoppers. Participants must sign a media release to be eligible to participate in the study.

If you are allergic to chocolate, milk, soy, peanuts, tree nuts, eggs, wheat products, salt, or any ingredients commonly found in chocolate bars, or are unable to participate in the experiment because of other physical factors, such as diabetes, please let us know in advance. Commercially available chocolate will be used in the study. The ingredient list is provided at the end of this document for you to review before consuming any of the chocolate.

The software used to track facial expressions must have an unobstructed view of your face. To that end, we ask that you not have facial hair (beard or mustache); secure hair away from your face; not wear a hat, cap, or glasses; remove any accessories that hide any part of your face; and refrain from eating, chewing, or talking during the study unless otherwise indicated.

INCENTIVES

You will receive a \$20 Amazon gift card for your participation in this study. No partial payments will be offered. You must complete all research activities to receive the gift card.

If your total monetary payments at Clemson University are equal or greater to \$600 in a single calendar year (January to December), then your name, address, social security number (SSN), date(s) of payment, and payment amount will be reported to Clemson University's Procurement and Business Services. Your SSN will not be shared with anyone but Clemson University's Procurement and Business Services and will not be stored with the study data.

AUDIO/VIDEO RECORDING AND PHOTOGRAPHS

You will wear eye-tracking glasses that will record what you look at. Your face will also be recorded to capture your expressions as you open a package. The only identifying information kept about you will be the video recordings of your face, which will be stored indefinitely in a secure repository on campus at Clemson University. Your images will only be used to analyze individual emotional reactions to the content you will be viewing. Your face will be the only personally identifiable information that will be kept; your name and email address, which were collected during the screening process will not be connected to the recorded images of your face.

You must sign a media release form prior to participating in the study.

EQUIPMENT AND DEVICES THAT WILL BE USED IN THE RESEARCH STUDY

Tobii 3.0 eye-tracking glasses will be used to record what you look at. Four webcams will be set up to record your face from different angles.

There are certain discomforts that you might experience if you take part in this research. They include feelings of discomfort while being recorded. You will be allowed to take rest breaks if needed, and you may quit the research at any time without penalty.

Some people are susceptible to epileptic seizures or loss of consciousness when exposed to certain flashing lights or light patterns present in everyday life.

Although highly unlikely, if you happen to feel uncomfortable in any way (dizzy, lightheaded, or nauseous) while using the Tobii 3.0 eye-tracking glasses, notify the research team immediately. If you continue to experience any discomfort after the study, please contact your preferred healthcare provider and notify the research team.

PROTECTION OF PRIVACY AND CONFIDENTIALITY

The results of this study may be published in scientific journals, professional publications, or educational presentations.

During this study, your name will be omitted from the record. Your data will be assigned to a single identification number for analysis purposes only and will in no way be connected with your name. Identifiable information (the recording of your facial expressions) collected during the study will be retained indefinitely and could be used or distributed for future research studies without additional informed consent from you.

We might be required to share the information we collect from you with the Clemson University Office of Research Compliance and the federal Office for Human Research Protections. If this happens, the information would only be used to find out if we ran this study properly and protected your rights in the study.

The study is funded by Sappi Paper. The analysis and the conclusions of the research will be sent to them.

CONTACT INFORMATION

If you have any questions or concerns about your rights in this research study, please contact the Clemson University Office of Research Compliance (ORC) at 864-656-0636 or irb@clemson.edu. The Clemson IRB will not be able to answer some study-specific questions. However, you may contact the Clemson IRB if the research staff cannot be reached or if you wish to speak with someone other than the research staff.

If you have any study-related questions or if any problems arise, please contact Dr. R. Andrew Hurley, PhD, ruperth@g.clemson.edu

CONSENT

By participating in the study, you indicate that you have read the information written above, have been allowed to ask any questions, and you are voluntarily choosing to take part in this research.

Participant's Signature [e-signature provided below]

Date [date provided above]

INGREDIENTS: Dark Chocolate (Fair Trade Certified™ Cane Sugar, Fair Trade Certified™ Chocolate Liquor - Processed with Alkali, Fair Trade Certified™ Cocoa Butter, Milk Fat, Soy Lecithin - an Emulsifier, Natural Flavor), Corn Syrup, Fair Trade Certified™ Cane Sugar, Fair Trade Certified™ Invert Sugar, Grade AA Butter, Fresh Whipping Cream, Fresh Whole Milk, Salt, Vanilla, Mediterranean Sea Salt

ALLERGY INFORMATION:
 Contains: Milk, Soy
 Products have been manufactured on shared equipment that processes Peanuts, Tree Nuts, Milk, Soy, Egg, Wheat Products.

Nutrition Facts	
3 servings per container	
Serving size	1/3 Bar (33g)
Amount per serving	
Calories	130
<small>% Daily Value*</small>	
Total Fat 7g	9%
Saturated Fat 4g	20%
Trans Fat 0g	
Cholesterol 10mg	3%
Sodium 170mg	7%
Total Carbohydrate 17g	6%
Dietary Fiber <1g	4%
Total Sugars 15g	
Includes 14g of Added Sugars	28%
Protein 1g	
Vitamin D 0mcg	0%
Calcium 19mg	0%
Iron 1mg	6%
Potassium 20mg	0%

*The % Daily Values (DV) tells you how much a nutrient in a serving contributes to a daily diet. 2000 calories a day is used for general nutrition advice.

SIGN HERE

clear

Q5



Clemson University
 Authorization for Use of Photographic/Image/Video/Voice Recording

Event: Shopper Research: Documenting the shopper's path to purchase
Date: September-December 2022
Program Name: Food, Nutrition, and Packaging Sciences
Clemson University Contact: Andrew Hurley, ruperth@clemson.edu

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In consideration for my participation in the above referenced Research Project at Clemson University, I, [name submitted above], hereby grant Clemson University the right to create and capture audiovisual, audio-only, visual-only, and literary works, including the production of video and/or audio tapes, photographs, films, and/or recordings of and from me and/or my performance (the "Content") by any method of recording. I hereby irrevocably and unconditionally grant to Clemson University the right to use (or allow or license others the right to use) the Content, my name, likeness and biographical information as follows:

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2. To use in composite or modified forms in any media, now known or later developed, including but not limited to publications, newspapers, television, radio, soundtrack recording, motion picture, filmstrip, still photograph, the Internet, the World Wide Web, or any transcript.
3. For any purpose throughout the world and in perpetuity, including by not limited to research, video archive, education, trade, advertising, and promotion.
4. I understand and agree that the video archive created as part of the above-described research project will be available to the research team described above and may be made available to other researchers and/or other individuals.

Clemson University shall be the exclusive owner of all copyrights and other rights in and to such Content, which shall be deemed a work-made-for-hire specifically ordered and/or commissioned by Clemson University. Without limiting the generality of the foregoing, Clemson University shall have the right to add to, subtract from, create derivative works based on, change, revise, rearrange or otherwise edit the Content. I hereby waive any "moral rights" I may have in or to the Appearance.

Clemson University is not obligated to use any of the rights granted by me under this Agreement, but I agree that Clemson University may do so without any payment to myself or any other person or entity. This is a non-union agreement. I acknowledge and agree that the production of the Content hereunder shall not be subject to the terms of any collective bargaining agreement. I waive the right to inspect or approve uses of the Content and these images, recordings and written copies of works featuring me and/or my performance.

To the maximum extent permitted by law, I hereby release Clemson University, its successors, assignees and licensees, and each of their respective parents, subsidiaries and affiliated companies (all such individuals and entities collectively referred to as the "Released Parties") from any claim of any kind or nature whatsoever arising from the use of the Content or my involvement in the Program including, without limitation, any and all claims, demands, or liabilities for invasion of privacy, infringement of my right of publicity, defamation (including libel and slander) and any other personal and/or property rights (collectively, the "Released Matters"). I intend and agree that this Release shall be effective as a full and final accord and satisfaction and general release of and from all Released Matters.

In connection with this waiver, I acknowledge that I am aware that I may hereafter discover claims presently unknown or unsuspected, or facts in addition to or different from those which I now know or believe to be true, with respect to the subject matter of this Release. Nevertheless, I intend by this Agreement to release fully, finally, and forever all Released Matters under this Release. In furtherance of such intention, the releases set forth in this Agreement shall be and shall remain in effect as full and complete releases notwithstanding the discovery or existence of any such additional or different claims or facts relevant hereto.


I affirm, represent, and warrant that I have the right, power, authority, and ability to enter into this release agreement and perform all actions in connection herewith and that I am not under any contract or other arrangement with any person or entity which would interfere with any aspect of my performance under this release agreement or diminish its value to Clemson University.

I agree that this document may be electronically signed and that any electronic signatures appearing on this document are the same as handwritten signatures for the purposes of validity, enforceability, and admissibility.

Participant's Signature [e-signature provided below]

Date [date provided above]

x SIGN HERE clear

Q6 

Please see the researcher to receive your anonymous ID number and begin the experiment

▲

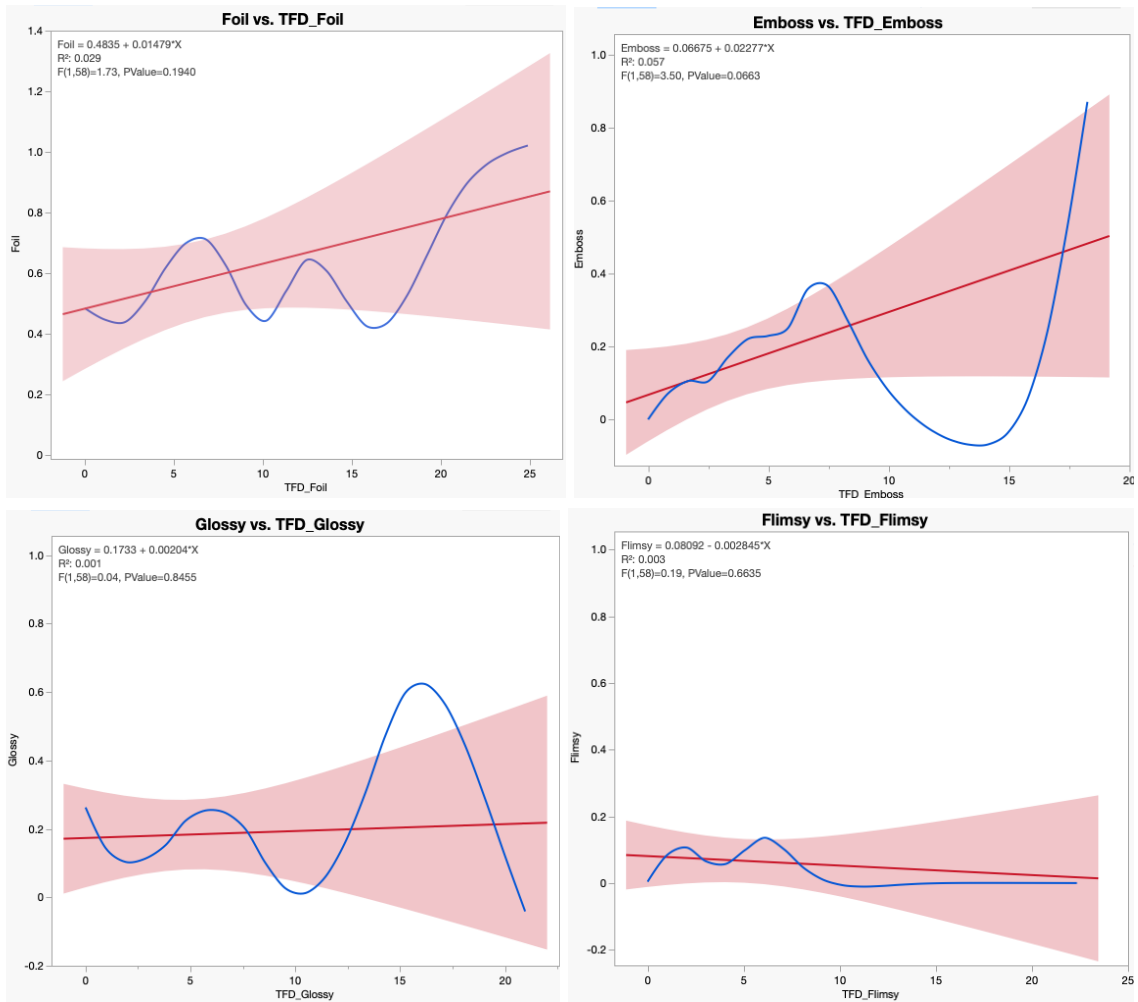
Add Block

End of Survey

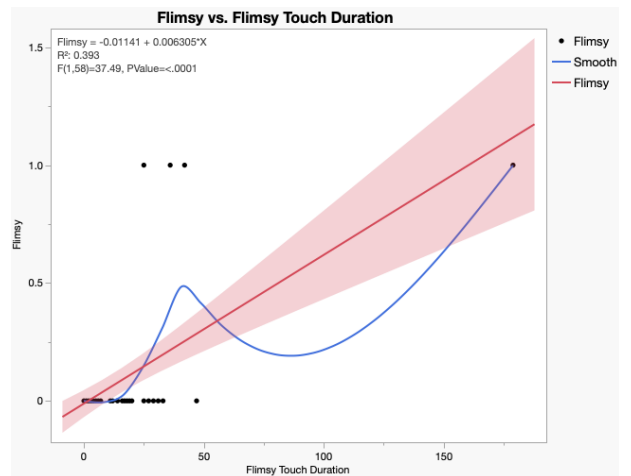
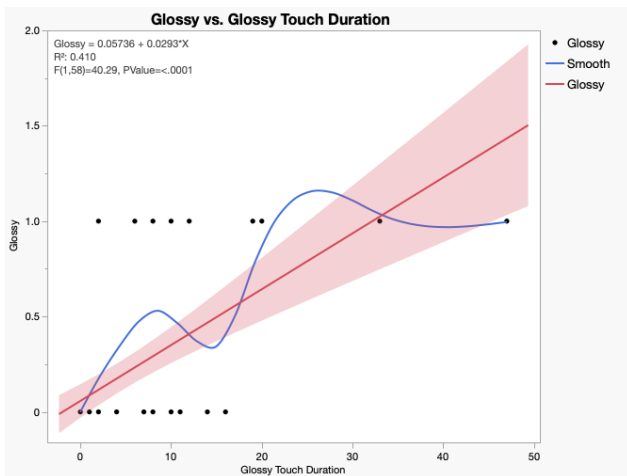
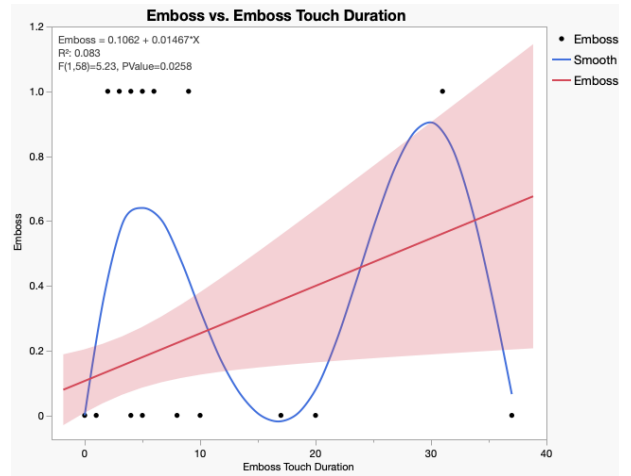
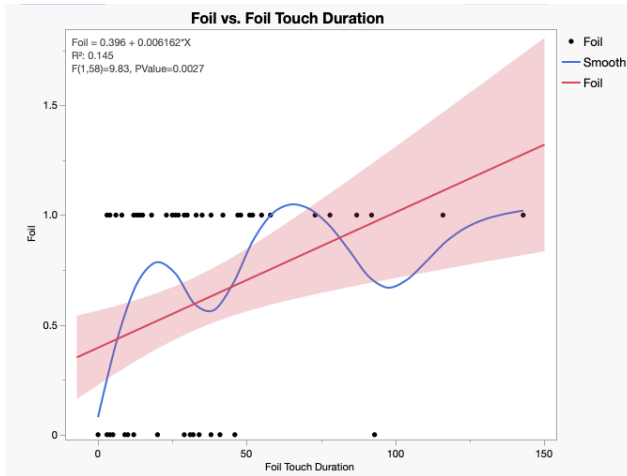
We thank you for your time spent taking this survey.

Your response has been recorded.

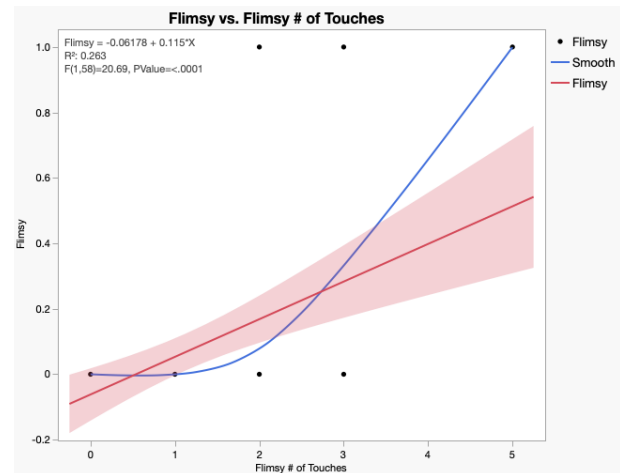
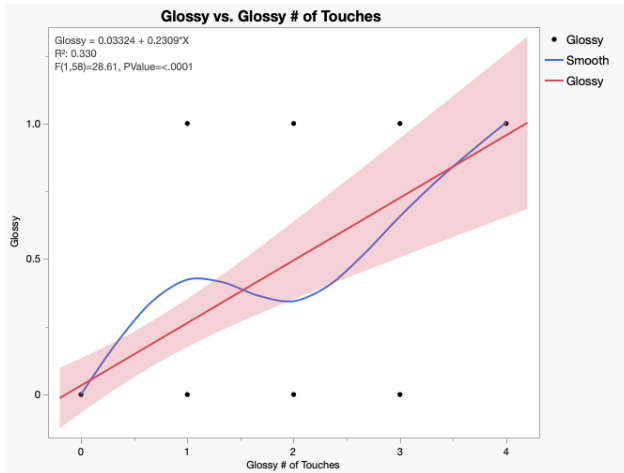
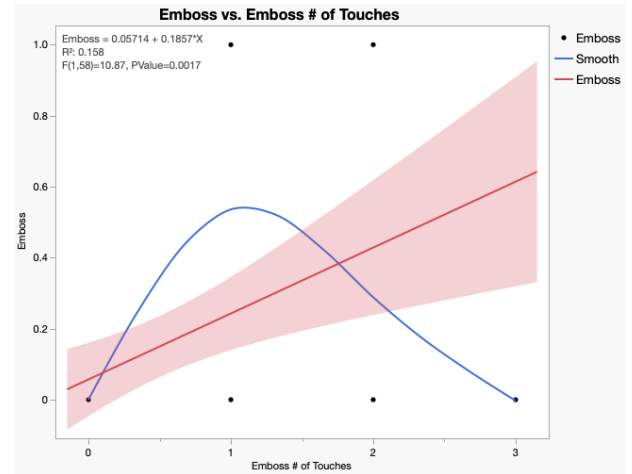
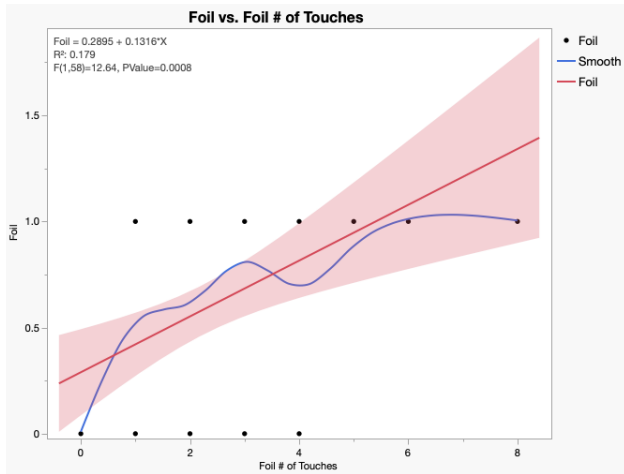
Appendix C - Correlation Charts



Correlation charts of each finish for Total Gaze Fixation Duration to Purchase for the item purchased



Correlation of each finish for Touch Duration to purchase for the item purchased



Correlation of each finish for Number of Touches to purchase for the item purchased

Appendix D - Correlation Significance Test for each finish (CBD)

Response Foil				
Effect Summary				
Source	Logworth			PValue
Foil # of Touches	1.131			0.07393
Foil Touch Duration	0.594			0.25442
TFD_Foil	0.001			0.99806

Summary of Fit	
RSquare	0.197939
RSquare Adj	0.154971
Root Mean Square Error	0.457023
Mean of Response	0.583333
Observations (or Sum Wgts)	60

Analysis of Variance				
Source	DF	Sum of Squares	Mean Square	F Ratio
Model	3	2.886606	0.962202	4.6067
Error	56	11.696727	0.208870	Prob > F
C. Total	59	14.583333		0.0060*

Parameter Estimates				
Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	0.2824184	0.109728	2.57	0.0127*
Foil # of Touches	0.0945481	0.051918	1.82	0.0739
Foil Touch Duration	0.0029464	0.002559	1.15	0.2544
TFD_Foil	2.779e-5	0.01138	0.00	0.9981

Response Emboss

Effect Summary

Source	Logworth	PValue
Emboss # of Touches	1.315	0.04836
Emboss Touch Duration	0.292	0.51007
TFD_Emboss	0.019	0.95733

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	52	6.3916902	0.122917	.
Pure Error	4	0.0000000	0.000000	Prob > F
Total Error	56	6.3916902		.

Max RSq
1.0000

Summary of Fit

RSquare	0.164485
RSquare Adj	0.119725
Root Mean Square Error	0.337842
Mean of Response	0.15
Observations (or Sum Wgts)	60

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	3	1.2583098	0.419437	3.6748
Error	56	6.3916902	0.114137	Prob > F
C. Total	59	7.6500000		0.0173*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	0.0531965	0.061185	0.87	0.3883
TFD_Emboss	0.0007686	0.014299	0.05	0.9573
Emboss Touch Duration	0.0049669	0.007492	0.66	0.5101
Emboss # of Touches	0.1583515	0.078459	2.02	0.0484*

Response Glossy

Effect Summary

Source	Logworth	PValue
Glossy Touch Duration	2.527	0.00297
Glossy # of Touches	0.963	0.10896
TFD_Glossy	0.672	0.21288

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	53	4.9865543	0.094086	.
Pure Error	3	0.0000000	0.000000	Prob > F
Total Error	56	4.9865543		.

Max RSq
1.0000

Summary of Fit

RSquare	0.44491
RSquare Adj	0.415174
Root Mean Square Error	0.298405
Mean of Response	0.183333
Observations (or Sum Wgts)	60

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	3	3.9967790	1.33226	14.9615
Error	56	4.9865543	0.08905	Prob > F
C. Total	59	8.9833333		<.0001*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	0.074897	0.056898	1.32	0.1934
TFD_Glossy	-0.010365	0.008226	-1.26	0.2129
Glossy Touch Duration	0.0216272	0.006962	3.11	0.0030*
Glossy # of Touches	0.1018196	0.06251	1.63	0.1090

Response Flimsy

Effect Summary

Source	Logworth	PValue
Flimsy Touch Duration	3.866	0.00014
Flimsy # of Touches	1.553	0.02799
TFD_Flimsy	0.158	0.69582

Summary of Fit

RSquare	0.4432
RSquare Adj	0.413371
Root Mean Square Error	0.192666
Mean of Response	0.066667
Observations (or Sum Wgts)	60

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	3	1.6546129	0.551538	14.8582
Error	56	2.0787204	0.037120	Prob > F
C. Total	59	3.7333333		<.0001*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	-0.05076	0.041775	-1.22	0.2294
TFD_Flimsy	-0.001991	0.005066	-0.39	0.6958
Flimsy # of Touches	0.0599869	0.026589	2.26	0.0280*
Flimsy Touch Duration	0.0048787	0.001191	4.10	0.0001*

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