

# The Affect of Versioned Packaging on Various Demographics

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## ABSTRACT

*This study challenged the concept of a single best package design for food products. Research found that typography played a crucial role in the consumer's perception of the quality and the value of a product. It was also found that, based on the consumer's purchasing intention, the use of type or graphics on a package could have either a positive or a negative affect on consumer perception of product value and quality. In addition, this study pointed out that these variables require careful testing in the marketplace, which can only be achieved in package designs that can be economically tested with a variety of audiences.*

**Key Words:** *Packaging and Demographics, Versioned Packaging, Short Run Packaging*

## 1.0 INTRODUCTION

Packaging is the fastest growing segment of the printing industry. Globally, packaging amounts to over a \$400 billion industry. The United States alone represents over a quarter of this market with \$115 billion, and the U.S. market is expected to grow to over \$129 billion by 2016. The packaging industry can be divided by material into five categories: paper, metal, rigid plastic, flexible plastic, and glass. Paper is the largest segment of the industry with a 31.5% market share. Metal is next with 23.9%, then rigid plastic with 21.4%, flexible plastic with 19.3% and finally glass with 3.9%[1].

Package printing presents great potential for innovation because of several emerging trends, such as environmentally friendly packaging, smart packaging, and short run digital print for versioning of package graphics. This potential for innovation is the result of several different factors including changing consumer habits, brand competition, and new discoveries in the food science industry. Diversity in the United States America's very foundation was built upon people from different countries and cultures coming together to live as one. America has always been known as a "melting pot," with diversity being its distinguishing characteristic. The U.S.

population is projected to grow to 394 million by the middle of century. Much of this growth will be achieved through immigration. According to Larson, there are 33.5 million foreign born civilians in the United States, who make up 11.7% of the total population. Furthermore, every 38 seconds someone from a foreign country comes to live in America [2]. With this diverse population come a variety of cultures, ethnicities, and religions.

As America grows and becomes more diverse it has become evident that different groups wish to maintain a semblance of their unique identity. As a result of this diversity there are now more variations of products being sent to market. Because of the marketing opportunities these diverse populations present, it is crucial to understand the motivating factors within these groups. Many companies have seized this opportunity by implementing techniques to attract the attention of a specific demographic. This change in perspective has become a marketing trend. For instance, Littrell & Halepete [3], comment that different generations have different responses towards marketing fair trade clothing. Younger generations had more of a positive response to the reasoning behind the promotion, while older generations responded more towards only what the promotion offered. Therefore, companies need to be aware of the different demographics of their target market

Packaging has evolved into more than just a means of protecting a product. With 73% of purchase decisions made at the time of sale, package design has become a crucial marketing tool [4]. The package plays a huge role in the consumers' decision making process and can contribute to the success or failure of a brand. The key to a successful package design is to fully understand the targeted consumers' wants and needs. Not all consumers react to packaging

the same way, so it is important to be able to identify and divide segments of the population into marketable groups. This approach, known as segmentation, is a key factor in successful marketing [5]. Each brand may have a different way of using segmentation in their marketing strategy, and there is much debate on the success of standard segmentation based on demographics versus more complex segmentation based on situational issues and mindsets [6]. Regardless of the method, segmentation as a general marketing tool has proved successful.

## **1.1 FOOD PACKAGING INDUSTRY**

The food packaging market has become the largest segment of the packaging industry comprising over 51% of total package revenues [7]. The reasons for this growth are the expansion of the purpose of packaging as well as changes in customer perceptions of packaging. As the variety of food products grows, competition for consumers' attention increases making packaging more important. Also, consumers now look for other benefits of packaging in addition to the standard functions of protecting and containing the product. Consequently, food packages have evolved from simple boxes to smart, sophisticated, and creative structures. This has given the food packaging industry the challenge to not only design packages that just contain a product, but also the opportunity to use innovative strategies in order to achieve differentiation in a crowded marketplace.

Food packaging is one area that lends itself to experimentation with segmentation. Regardless of the demographic, everyone purchases food, and subsequently has some interaction with the packaging it comes in. This leaves the food packaging industry open for a great deal

of exploration in design, and it makes for an excellent potential market to implement versioned packaging in order to reach more variety of consumers. Regardless of the type of packaging the key to success in versioned packaging is to find a correlation between demographic groups and their preference for a particular design. Understanding these preferences will help companies design packages to attract specific groups.

## **1.2 INCOME LEVEL**

One potential demographic to use in segmented marketing is income level. Taking a look at the different levels of income and marketing based on this groups' needs can produce increased results in the consumer's reaction to a product. Although direct correlation between the graphics of a package and income level have not yet been made, research has been done to show the different mindsets of each income level and the effect this has on their consumer purchasing behavior. According to Chen & Green [8], both low and high income level consumers paid more attention to price deals in products while middle income consumers overall were highly price sensitive. Low income consumers also had more of an awareness for brand advertising. Understanding the different levels of income and their mindsets can be leveraged through the design of a package and help target these specific consumers in different ways.

## **1.3 LITERACY LEVEL**

Within the United States, there is a wide range of education. According to the 2012 U.S. census estimate approximately one-fifth of adults over 25 years of age received a Bachelor's degree; however, over one fifth did not graduate from high school [9]. A significant outcome of this

educational gap is the range of literacy levels it produces. According to the National Adult Literacy Survey (1993), about 50% of the population is considered to be at a Level 1 or Level 2 literacy level. Both levels are considered to be at or below a 6th grade reading and writing level [10]. With such a high percentage of the population at a low-literacy level, it is important to explore how literacy affects consumer decisions. Research showed that limited literacy creates problems in areas such as price, product choice, distribution, and promotion [11]. In this study even though the consumers' choice in product was mainly restricted to well-known brands, some subjects still had trouble differentiating one type of product from another. When constructing any type of marketing communication for consumers with lower literacy levels, it is important to consider clarity, readability, and specificity [12]. The message intended for the consumer should be limited in words and ideas, and it should avoid abstract concepts that can be left to interpretation. Furthermore, the use of visual aids is crucial for low-literacy consumers. Studies show that these consumers rely heavily on visual aids to understand a product [13], [14]. Using photos or illustrations as opposed to written descriptions to communicate the use of a product can help these consumers make more informed decisions.

## **1.4 AGE**

In 2010 the median age of the U.S. population was 37, a 5% increase since 2000. Twenty-four percent of the population was under 18, 37% was 18-44, 26% was 45-64, and 13% was above 65. Approximately 10% of the U.S. population consists of teenagers, a significant portion of the market that companies are focusing on. The teenage population is the most ethnically diverse, becoming more influential as their numbers

continue to grow twice as fast as the overall U.S. population [9]. In addition, teenagers bring an incredible opportunity for companies to invest in because of their higher level of engagement with social media. Research also showed that color influences the choices that teenagers make and should be further studied for marketers to properly target that age group [15]. The age demographic of college students, roughly 18-22 year olds, has also provided a market for businesses. According to Anderson [16], some of the top items that students spend their money on are food, textbooks, cars, and school supplies. While teenagers might provide a way into the higher end product market for businesses, college students tend to look for cheap, fast, and convenient options.

With the Millennial generation entering into an age of higher purchasing power and the Baby Boomers reaching old age, there is no doubt that companies will have to change the way they target their consumers. Rocha, Hammonds, & Hawkins [17], did a study to show preferences in fashion and clothing consumption, based on different nationalities and between different age markets. Their research concluded, "Being able to identify and communicate product benefits, which appeal to mature consumers, offers new challenges to the industry. Older consumers are more discerning about product attributes and respond to marketing that reflects rather than compromises their key values."

## 1.5 ETHNICITY

As immigration continues to bring in nationalities from around the world, specific market segments are becoming more prominent. Different cultures bring in a wide variety of meanings and responses to different, colors, images, and typography. In addition, different products also pose another venue

for targeting different ethnicities. One of the most obvious cultural differences seen between similar products is the color of packaging. While blue is popular across the globe, it would not be beneficial to make every package blue. The sacred color in India, orange, is not the same as the sacred color for Muslims, which is green. White has a range of different meanings, from sacred to death. The Inuit culture holds white at such a standard that they have 17 words to describe it, all meaning something different [18]. According to Singh [18], "The implication for marketing managers is that they should be aware of the perceived importance of colors and their interpretation in a particular geographic area."

A trend throughout the U.S. is the increased availability of ethnic products. For example, Havana Cola is a unique key lime beverage that stems from deep Hispanic culture. This product is not only becoming more popular among the states, but it is also being packaged to represent the tastes of Hispanic culture [19]. Designing packages for specific ethnic groups has become a powerful marketing tool in package design. Contrary to the melting pot metaphor of different cultures and ethnicities coming together as one, people are acknowledging their cultural heritage and younger generations are becoming more outspoken in their desire to maintain a connection to their roots. As the Hispanic population in the U.S. continues to grow, there is a demand for more authentic products. Brown [20] contends, "This sense of ethnic pride extends beyond Hispanics. Other ethnic minorities that tend toward preserving their own cultural identity include Muslims and Middle Easterners, and these populations are growing in the U.S. as well." This has provided a huge opportunity for marketers, and there has been a noticeable rise in different products on shelves, both being marketed towards the product's demographic, and to the

American population as a whole [21]. This change in marketing has pushed Americans to be more open towards the differences in cultures and to try new things. According to Waxman [21], “the creation and proliferation of these products can be understood as part of an overall convergence within American culture of multiple ethnic strains that is leading to fusion cuisines like Thai-Mexican.” This example shows how cultures are influencing the marketing and availability of different products on the shelf.

## 2.0 RESEARCH DESIGN

The purpose of this research was to determine customer preferences for food package designs based on demographics, such as age range, income level, education level, and ethnicity. Packages were varied based on the elements of color, typography, photographic detail, and the amount of copy.

To conduct the experiment a survey instrument was created. Survey subjects were asked their age range, income level, and education level. These demographics were presented to subjects in wide ranges in order to encourage responses. Ethnicity

was based on standard U.S. Census definitions. For the experimental procedure a generic food package containing crackers was designed. Crackers were chosen for the food package because of their widespread appeal to all of the listed demographics. The package designs varied in four graphic elements (Figure 1).

The two contrasting versions of each element resulted in 16 variations of the package design. For the experimental procedure a blocked  $2^3$  fractional factorial design was used. The experimental design consisted of 10 blocks with 8 different package designs in each block. The package designs were shown to individuals outside several grocery store locations in the California Central Coast area. Subjects were asked to view all 8 package designs in a single block and indicate on a 160mm unmarked line their preference for each design. The left side of the line indicated a low preference and the right side indicated a high preference for a package design. To randomize the display of packages each subject was shown a different block of package designs in a repeating cycle of block 1 through block 10. Figure 2 shows an example of the scale used by subjects (ruler added).



Figure 1. Variable elements in package design

Using the line below mark your preference for a package design by placing the number of the package on the line. The left side indicates a low preference for a design and the right side indicates a high preference for a design.

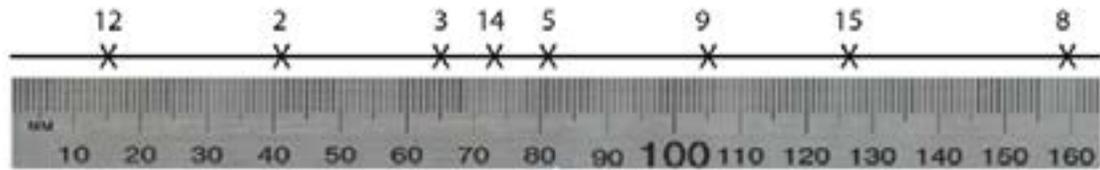


Figure 2. Example of Scale

For analysis a ruler was used to determine the distance in millimeters of each mark on the line. The results were then entered into SAS JMP software. The data was analyzed using a split plot design and logistic regression to determine the part worth value for each design element based on specific demographics. The results were then displayed in graphical form.

### 3.0 RESULTS AND ANALYSIS

In all 84 subjects from three different locations participated in the study resulting in 663 observations. A logistic regression was used to predict choice based on binary data, and a p value of  $\leq 0.05$  was used to determine the significance of results

Whole plot factors:

- Age
- Income
- Education
- Ethnicity

Sub plot factors:

- Typography—plain versus cursive
- Photo versus illustration
- Copy versus info graphic
- Color palette

### 3.1 MAIN EFFECTS OF SUBPLOT FACTORS

#### Color Palette

Figure 3 shows that there was no significant difference in response to either color palette ( $n = 84$ ,  $p = 0.4788$ ).

#### Photo Versus Illustration

Figure 4 (page 19) shows a statistically significant preference for the use of a photo over the illustration in the package design ( $n = 84$ ,  $p = 0.0029$ ).

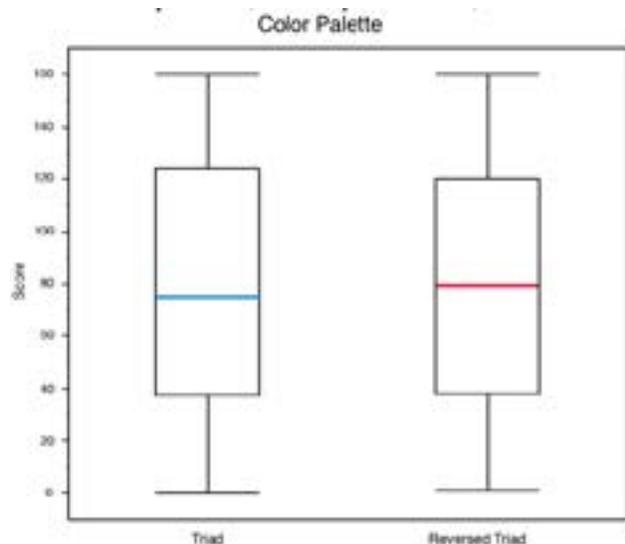


Figure 3. Score for change in color palette.

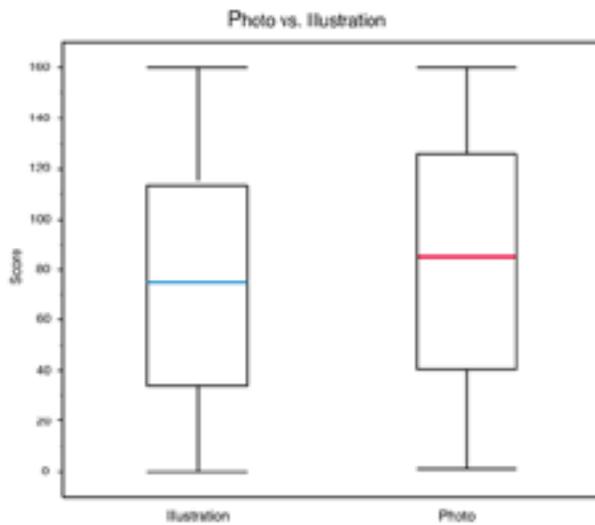


Figure 4. Score for photo versus illustration

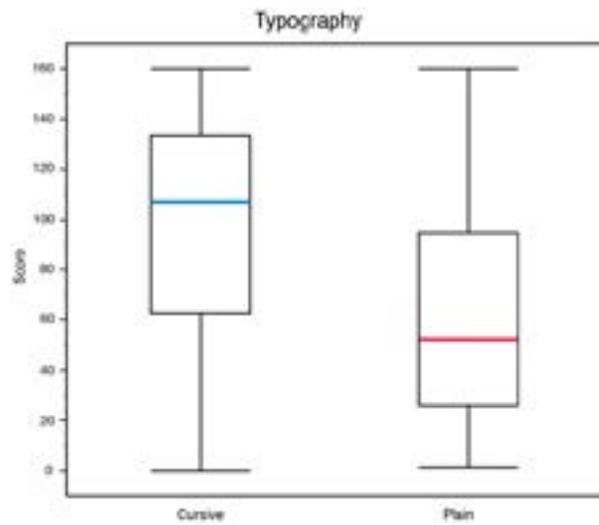


Figure 6. Score for typography, cursive versus plain.

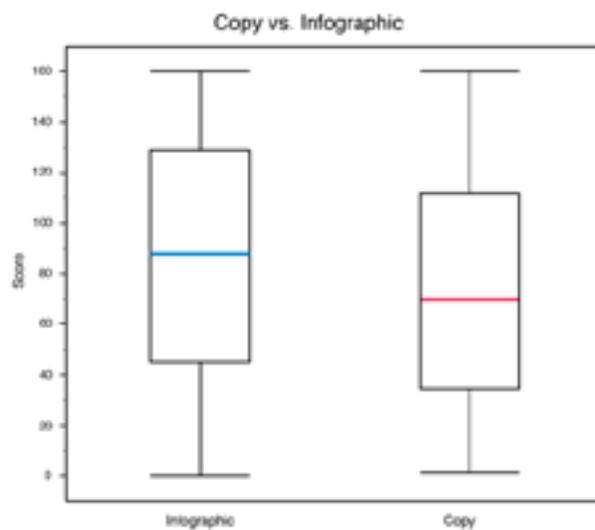


Figure 5. Score for copy versus infographic

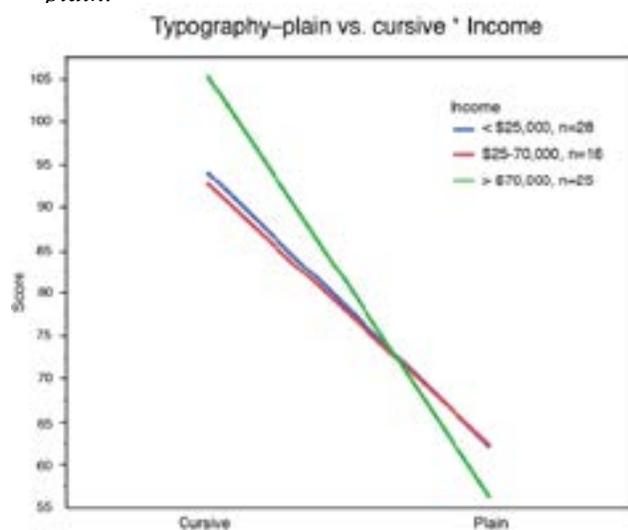


Figure 7. Score for Typography-Cursive versus Plain \* Income Range

### Copy versus Infographic

As demonstrated in figure 5, there was a statistically significant preference for the infographic over the use of type (n = 84, p = 0.0240).

### Typography-Plain versus Cursive

Figure 6 shows a strong statistical preference

for the use of cursive type over plain type in the package design (n = 84, p = < .0001).

### Main Effects of Whole Plot Factors

Comparing the affect of cursive or plain package typography with income range (Figure 7) yielded a significant result (p = 0.0159). Figure 7 shows that all income ranges preferred

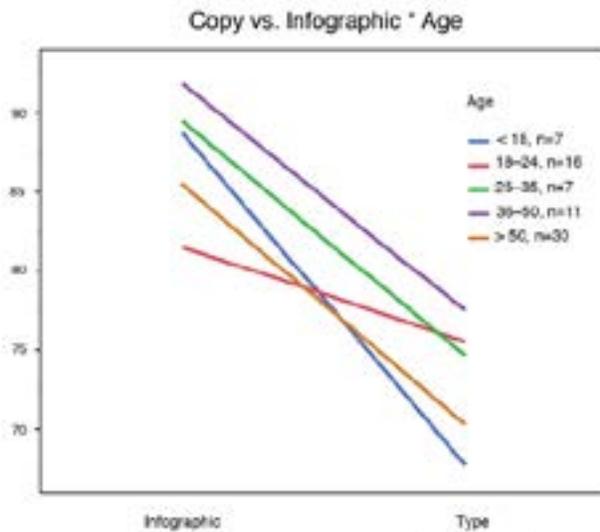


Figure 8. Score for Copy versus Infographic \* Age Range

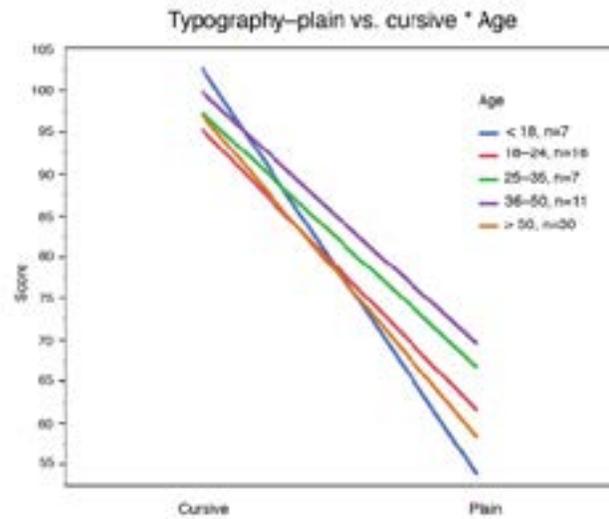


Figure 10. Score for Typography—Plain versus Cursive \* Age

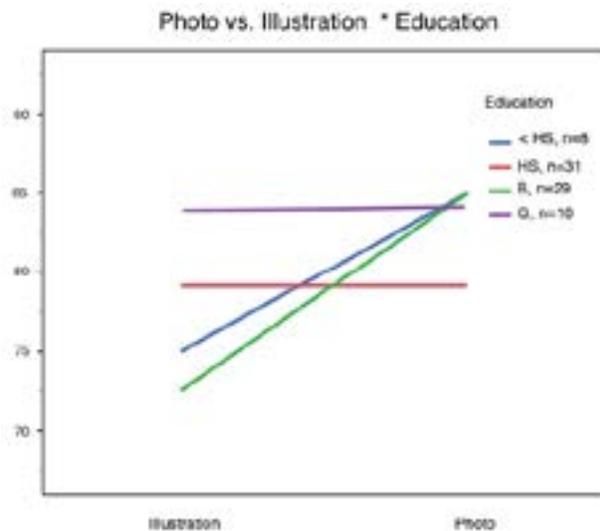


Figure 9. Score for Photo versus Illustration \* Education.

cursive type to plain type on the package design. Respondents who claimed an income of over \$70,000 showed the strongest preference for cursive type. Respondents whose incomes ranged from less than \$25,000 to \$70,000 also showed a similar, but reduced preference for cursive type.

Comparing the affect of copy versus infographic to age range (Figure 8) also yielded a significant result ( $p = 0.0344$ ). All age ranges preferred the infographic to the type on the package. The 36 to 50 and 25 to 35 year old groups showed the strongest preference for the infographic. The preference decreased for both the under 18 and over 50 year old groups. Interestingly, the 18 to 24 year old group showed the least preference for the infographic.

Comparing the use of a photo versus an illustration to education level (Figure 9) resulted in a significant result ( $p = 0.0041$ ). Interestingly, those with less than a High School Diploma and those with a Bachelor's Degree preferred a photo to an illustration on the package. Those with a High School education had an equal preference for a photo or an illustration. Likewise, those with a Graduate Degree had an equal preference for a photo or an illustration.

Figure 10 shows that all age ranges had a strong preference for cursive type over plain type on the package ( $p = 0.0004$ ), with those younger than 18 showing the strongest preference for cursive type.

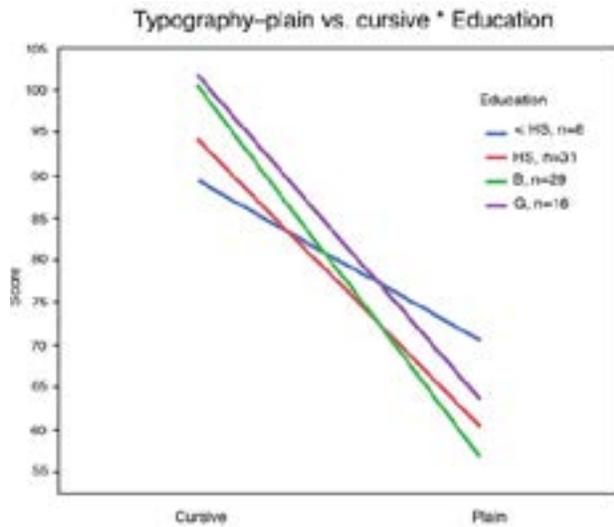


Figure 11. Score for Typography—Plain versus Cursive \* Education

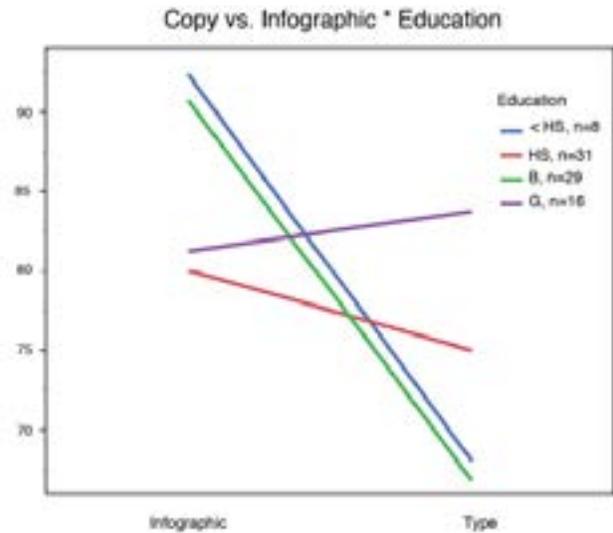


Figure 13. Score for Copy versus Infographic \* Education

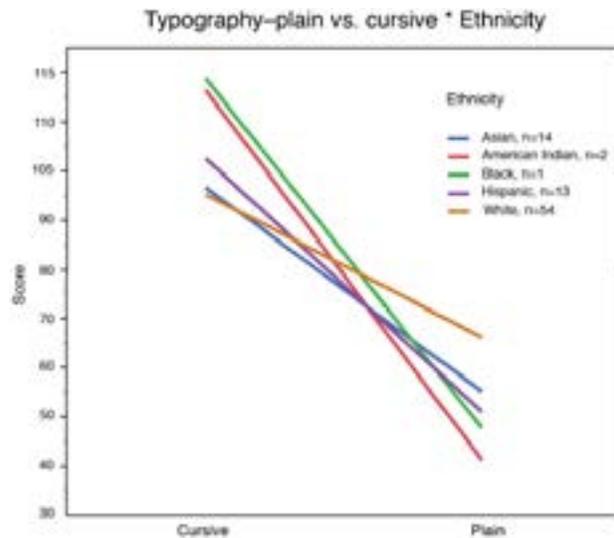


Figure 12. Typography—Plain versus Cursive \* Ethnicity

Figure 11 shows that all education levels preferred cursive to plain type on the package ( $p = 0.0096$ ). However, those with less than a High School Diploma showed a reduced preference for cursive over plain.

All ethnicities (Figure 12) preferred cursive type to plain type on the package ( $p = 0.0461$ ).

However, those that declared their race as White or Asian did show a reduced preference for cursive type.

Figure 13 shows that all respondents who declared an education level up to a Bachelor’s Degree preferred the infographic to type on the package ( $p = 0.0041$ ). However, those with a High School Diploma showed a reduced preference for the infographic. Those with a Graduate Degree preferred the type to infographic.

### 3.2 TYPOGRAPHY

Overall, there was a strong preference for the cursive font over the plain font throughout all demographics. Many respondents commented that the plain font was “boring” and although the product was the same, respondents said that the plain font presented a generic, lower quality feel. This was especially true of those with an income over \$70,000. The higher preference of this group may be due to a link between disposable income and the desire for higher quality

products. Those with less than a high school education also showed a lowered preference for cursive type. It is possible that the readability of the font impacts this demographic in a positive way by making it easier for them to assess the product and its contents.

Compared to other ethnicities, White and Asian respondents had the strongest preference for the cursive font versus the plain font. However, this may be due to the high number of responses from these two groups. Also, those under the age of 18 also had a significantly higher preference for the cursive font. A possible explanation for this could be their lack of experience in choosing products among competing brands. Therefore, typography may impact their decision more than other age groups.

### **3.3 GRAPHICS**

18-24 year olds had a lower preference for the infographic compared to other age groups. Respondents in the 18-24 year old age range commented that the infographic seemed less graphically appealing than the type. Others remarked that the infographic looked unappetizing. It appears that 18-24 year olds are more opinionated about the perception of the quality of food based on an infographic than the other age ranges.

Nevertheless, results showed a general preference for the infographic over the type. Those with a High School Diploma still preferred the infographic, but the results showed a lower preference. However, those with a Graduate Degree preferred type to the infographic. It appears that those with a Graduate Degree are more interested in text than other groups. While this can be suggested, the data could also be skewed from a lower number of responses in this

demographic. It was interesting that those with a High School Diploma had a lower difference in preference between type and infographic than those with a Bachelor's Degree. Since the number of respondents with a High School Diploma or a Bachelor's Degree was approximately equal the reason for this result needs further investigation.

### **3.4 PHOTO**

Throughout our data much of the significant observations occurred within the High School and Graduate Degree demographics. This is also true for the preference of photo to illustration on the front of the package. While all education levels preferred the photo to the illustration, those with a High School Diploma and Graduate Degree almost equally favored the photo to the illustration. Comparing Figure 9 (Score for Photo versus Illustration \* Education) and Figure 13 (Score for Copy versus Infographic \* Education) shows an interesting parallel among educational levels. Those with either a High School Diploma or a Bachelor's Degree preferred the photo to the illustration and the infographic over the type. However, those with less than a high School Diploma and those with a Graduate Degree shared a similar but lower preference for these options. One explanation is that both groups engage in a common task with a different purpose. Those with less than a High School education read food packages carefully because poor choices can be expensive, while those with a Graduate Degree read food packages carefully in order to make better product quality choices.

### **4.0 CONCLUSIONS**

It was apparent that the respondents' choice of a package design centered on typography. The type used for the name of the product appeared

to convey a sense of quality to all respondents regardless of age, income, education, or ethnicity. These results indicate that the choice of typography on a food package needs to be carefully matched with consumer perception of the quality and value of a product.

Additionally, the design of the visual components of the package appeared to alert rather than persuade lower and higher educational groups that wished to make an informed choice based on either price or quality. This indicated that visual elements in package design could not be used in a manner that disregarded the target audience. Overall, this study challenged the assumption of single best package design. However, these variables can only be fully tested if package designs can be economically modified to test the consumer's reaction in the marketplace.

#### **4.1 LIMITATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH**

One limitation to this research was the number of responses by diverse ethnicities. Although efforts were made to sample a diverse audience many of the respondents were white. It would be interesting to repeat this research in locations that are more ethnically diverse. Also, the role that graphics play in a consumer's perception of food product quality warrants further research.

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