The Impact of Human Imagery On Food Packaging with Various Demographics

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Abstract

The research aims to determine if consumers of different demographic groups respond to imagery, especially human imagery, on food packaging differently.

Background: During the summer of 2020, brands such as Quaker Oats' (PepsiCo) Aunt Jemima, Con Agra's Mrs. Butterworth's, Mars' Uncle Ben's, and farmer-owned cooperative Land O' Lakes have rolled out branding changes; acknowledging the culturally offensive imagery on their packaging. (N. Nittle, 2021)

The authors of this paper are not researching the implications of offensive imagery produced from stereotypes. Rather, the pullback of imagery from these brands struck an interest to determine if subjects – in North America – respond to imagery in food packaging differently; if that imagery contained photographs of white, non-white, and mixed-race people.

Consumer packaging is a rapidly growing industry, given the growth in world population, access to groceries and markets, e-commerce, and a rising middle class (to name a few). There are many aspects of consumer packaging that draw the consumer in to create a relationship with the brand. Color, imagery, structure, typography – all of these are design elements aimed at attracting attention of the consumer at very quick time intervals.

At the point of sale (or, inferred, ecommerce as well), well designed packaging can "forge a truly unique and personal relationship with the consumer -'be my friend' (Connolly, 1996).

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Similarly, Simmonds and Spence state, “The sight of food has a profound effect on us, from making us feel hungry/increasing our appetite, through to encouraging us to imagine what it would be like to eat that which we see” (Simmonds and Spence 2019).

According to Simmonds and Spence, “Images of food constitute salient visual stimuli in the mind of the consumer. They are capable of promoting both feelings of hunger and the desire for food.” (Simmonds and Spence, 2016). Fan, et al states, “humans are known to have selective attention to visual stimuli. Selective attention is the process of focusing on a particular object in the environment for a certain period of time. Attention is a limited resource, so selective attention allows us to tune out unimportant details

and focus on what really matters. Previous studies have explored the relation between human attention and visual sentiment and found that humans attend to emotional objects more than emotionally neutral objects” (Fan, S, et al 2020).

In 2015, Vogl’s work on imagery in food packaging saw a statistically significant difference in consumer preferences of (crackers) food packaging with imagery vs. illustration, but the imagery was of food, not human imagery (Vogl, H. E, 2015).

There is little study of how human imagery in food packaging can provide that connection with the brand’s product, despite many brands using human imagery in their packaging. As it is well-known that consumers acknowledge packaged products (especially on grocery shelves) within seconds, that imagery on the package must allow the consumer to “focus on what really matters”. Yet, can this research asses whether human imagery, which includes photos of non-white, mixed race, and white families impact a consumer response to the brand?

Introduction:

According to Mordor Intelligence, the packaging industry in the United States was valued at USD 184.65 Billion in 2021, and it is expected to reach USD 218.12 Billion by 2027 (Mordor Intelligence, 2022). Specifically in food packaging, Market Data Forecast estimates the market size at USD 18.60 million in 2021 and it projects the market size to increase to 31.69 million by the end of 2026 ((Market Data Forecast 2022. This market growth in US food packaging is illustrated in figure 1.

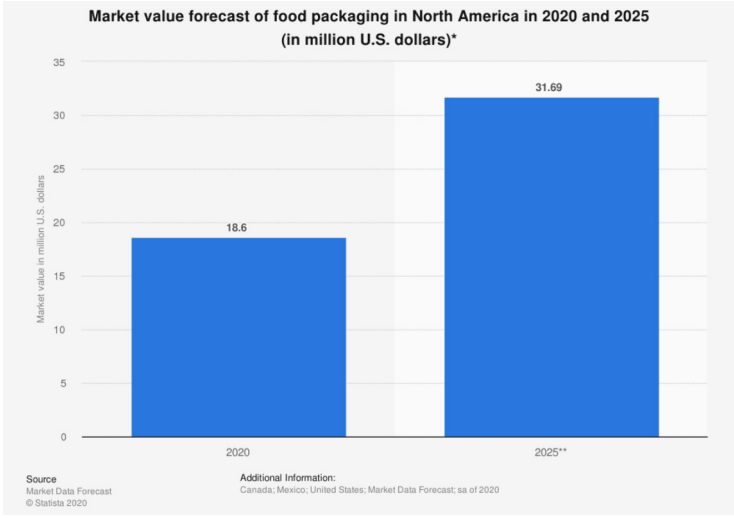


Figure 1: *market value of food packaging, Market Data Forecast (Statista)*

Specifically for this research, the authors chose to focus on dry pasta packaging, and noted in this Statista graph, the industry for dry pasta is slated to continue to grow through 2024. According to this statistic, 267.11 million Americans used dry packaged pasta (spaghetti, macaroni and noodles - requires cooking) in 2020. This figure is projected to increase to 272.85 million in 2024. Given the basis of growth and the high volume of consumption, this food product was logical for the package choice (see figure 2).

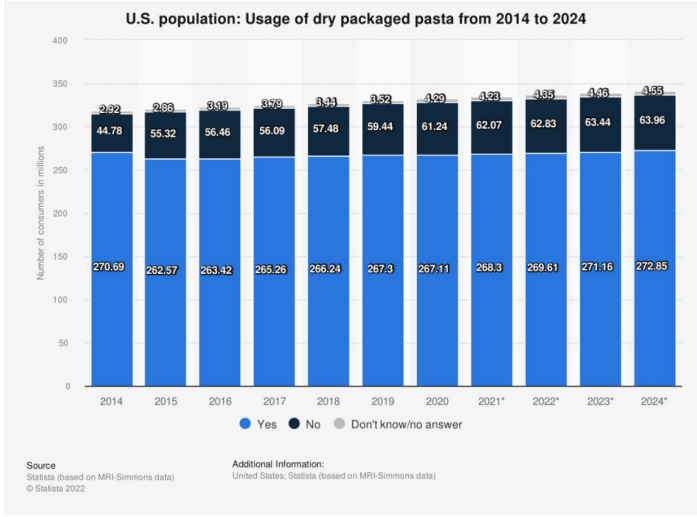


Figure 2: *usage data projection dry pasta, Statista*

Clearly, consumption of packaged food products is on the rise, and consumers are offered a variety of choices; in-store and online. This research intends to determine which demographic groups are most impacted by human imagery in food packaging given the increased attention of offensive imagery in the media.

Method and Materials:

A fictitious pasta product was created (*Janeiro Pasta brand*), and a paperboard box form factor was the basis for creating digital renderings of the dried food product. Via online survey, consumers (subjects) were given the opportunity to identify which of multiple packaging visuals would most impact them when purchasing the product. The packaged products include one option for packaging structure (paperboard box), a series of images were included on each package, different background colors (yellow, red, green and blue), and varied typography. The series of images range from product graphic/image to various presentations of human imagery. The human imagery elements consisted of groups of people eating/ enjoying the pasta. Since the literature does indicate that images of food increase stimuli for connection with the package, the researchers felt it was important that the human imagery was interacting with the food product. The images were of a white family, a non-white family, and a mixed-race family. A total of sixteen packaging variants (referred to as treatments herein) were generated, but subjects were only shown four for their particular survey.

The survey was conducted with a completed IRB from Cal Poly. "To ensure Cal Poly's commitment to protect human subjects in research, the University's Institutional Review Board (IRB) evaluates research projects for compliance with ethical standards regarding the treatment of human subjects" (https://research.calpoly.edu/HS-homepage).

Subjects were asked demographic questions, then asked to choose their preferred package of Janeiro pasta. Subjects were given four choices of packages to choose from – which could illustrate the various color, typography, imagery, and one package with no imagery.

The survey instrument Qualtrics was chosen for its use in A/B style of testing consumer responses through surveys. This research used a process similar to A/B testing in that subjects who take the surveyare showed different versions of the packaging and are tasked to choose their preferred package with options to provide anecdotal comments. According to VMO, A/B testing "… refers to a randomized experimentation process wherein two or more versions of a variable (web page, page element, etc.) are shown to different segments of website visitors at the same time to determine which version leaves the maximum impact and drives business metrics" (https://vwo.com/ab-testing/). Although A/B testing is commonly used in app development and website traffic surveys, it is useful in other consumer/

marketing surveys as well. For this survey, Qualtrics randomized the renderings such that each subject taking the survey had a different combination of pasta packaging to choose their preference.

Subjects were asked the following questions:

1. Do you agree to voluntarily take this anonymous survey?
    a. Yes – please continue
    b. No – thank you for your time. Survey is closed

2. How do you identify?
    a. Male
    b. Female
    c. Non-binary
    d. Other/prefer not to disclose

3. Race
    a. American Indian or Alaskan Native
    b. Asian
    c. South West Asian/North African (SWANA)
    d. Native Hawaiian or Pacific Islander
    e. Black
    f. White
    g. Not listed above

4. Ethnicity
    a. Hispanic origin
    b. Not of Hispanic origin

5. How old are you?
    a. 18-24
    b. 25-40
    c. 41-56
    d. 57 -66
    e. 67+

6. How often do you order food product online?
    a. Never
    b. Occasionally
    c. Frequently

7. Please rank the following pasta packaging on the most pleasing visual graphics (1-4, 1 being most pleasing, 4 being least pleasing)
    _ space for qualitative comments

Figure 3 illustrates the total number of treatments possible for the survey. When subjects opened the survey, they were only shown four treatments, randomized.

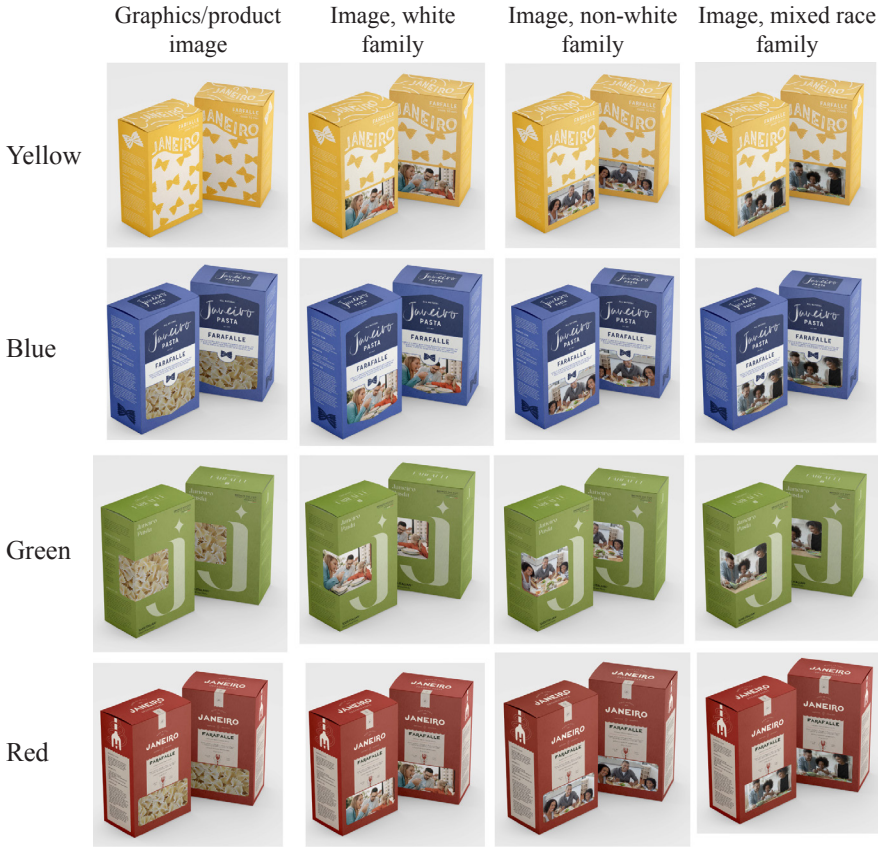
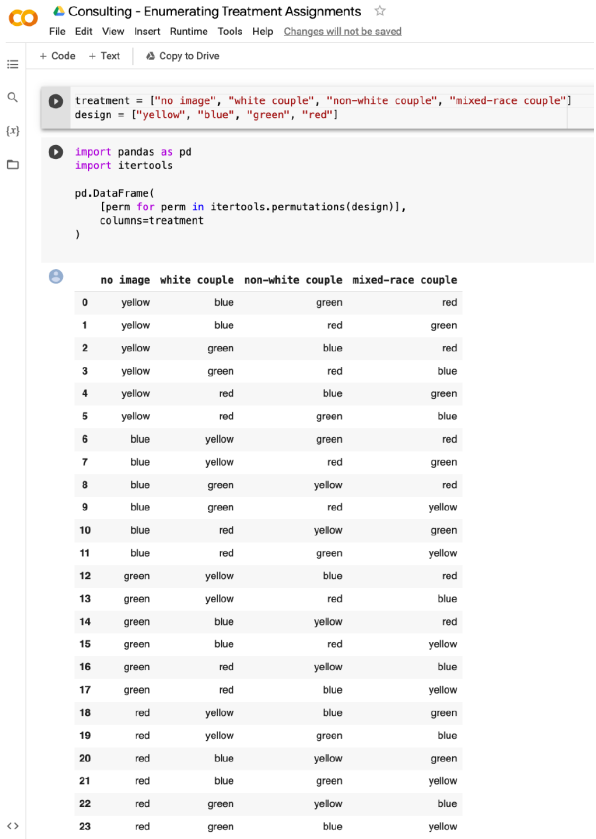


Figure 3: *Janeiro pasta packaging – different possible treatments of color, imagery, typography.*

The survey used data written in Colab that allowed the survey instrument Qualtrics to randomly select a treatment set for survey respondents to see (color, imagery, graphics). Google Colab (short for Colaboratory) is a product from Google Research. Colab allows for writing and executing python code and is "especially well-suited to machine learning, data analysis and education." (Google). Figure 4 illustrates to Colab dataset.

As noted in figure 3, subjects were shown 4 treatments in the survey instrument. Figure 5 is an example of what one subject's survey looked like. The subjects were shown one example each of color, imagery, and product imagery/graphics.



	no image	white couple	non-white couple	mixed-race couple
0	yellow	blue	green	red
1	yellow	blue	red	green
2	yellow	green	blue	red
3	yellow	green	red	blue
4	yellow	red	blue	green
5	yellow	red	green	blue
6	blue	yellow	green	red
7	blue	yellow	red	green
8	blue	green	yellow	red
9	blue	green	red	yellow
10	blue	red	yellow	green
11	blue	red	green	yellow
12	green	yellow	blue	red
13	green	yellow	red	blue
14	green	blue	yellow	red
15	green	blue	red	yellow
16	green	red	yellow	blue
17	green	red	blue	yellow
18	red	yellow	blue	green
19	red	yellow	green	blue
20	red	blue	yellow	green
21	red	blue	green	yellow
22	red	green	yellow	blue
23	red	green	blue	yellow

Figure 4: *Colab data set*

Figure 5: *example of subject view of survey*

Results:

A total of 131 respondents took the survey over a monthlong period. The survey was administered via various electronic media such as social media (LinkedIn, Facebook) and email. The survey was sent to subjects living in the United States.

The respondents mostly identified gender as female (65.8 % vs. 32.5% male, vs 1.59% nonbinary). Initially this gave the researchers pause, as the concern would likely result in skewed data, but as will be shown below, this was not the case. Figure 6 illustrates the respondents gender identity.

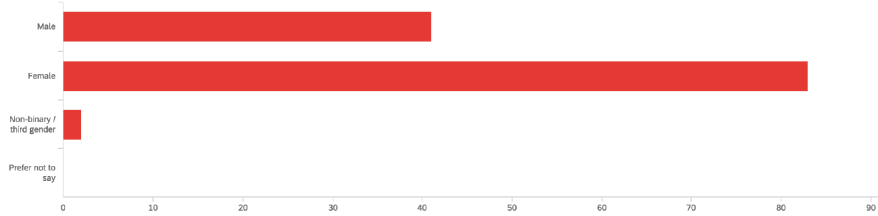


Figure 6: *identity of survey subjects*

The subjects primarily identified race as white (74.13%), followed by Asian (11.19%), and Hispanic (6.29%). Again concern over the high percentage of white respondents was expressed, but the results indicate there was no skew. Figure 7 illustrates the breakdown of race identification.

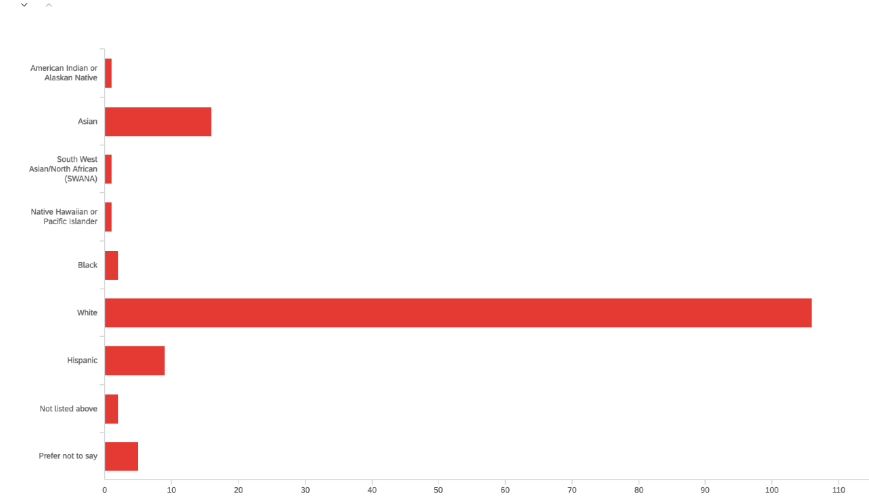


Fig 7: *subject race identification*

Subject age varied somewhat with the main concentration falling within the ages of 41-56 years (36%) followed by 18-24 years (28%), 25-40 years (17/6%), 57-66 (14.4 %), and 67+ (4%). Figure 8 illustrates age breakdown.

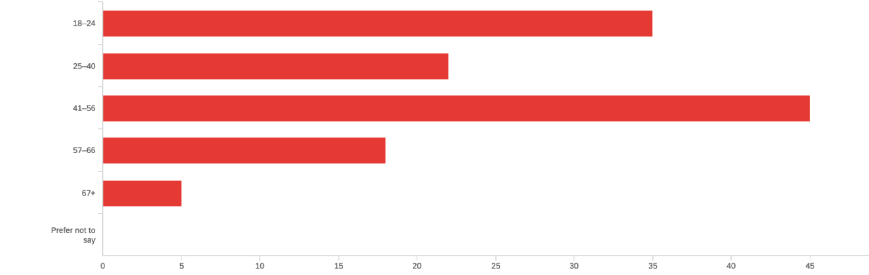


Figure 8: *age demographics*

When asked how often respondents purchased groceries online, the majority indicated they did occasionally (72.22%). This response indicates that the online survey was a logical survey to take, as the depictions of pasta were 3D renderings, and if subjects were to order food online the representation would be similar. Subject would then be used to - and understand the renderings in the survey. Figure 9 illustrates the response to online grocery activity.

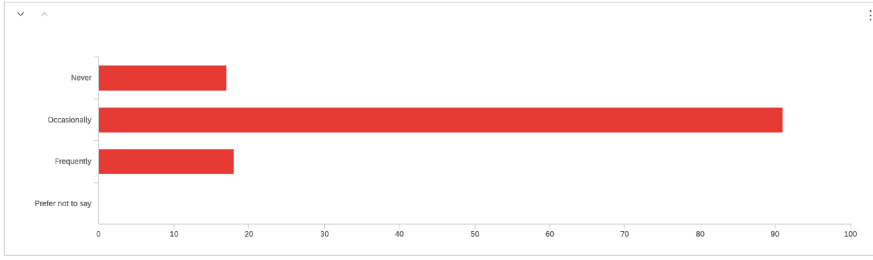


Figure 9: *frequency of online grocery orders*

Subject packaging preference:

As far as colors and typography, the blue layout form factor was a slight favorite (29.4%), followed by red and yellow (both at 25.5%) while green was somewhat the least favorite (19.6%), but the difference among them was not as significant as the data on imagery. Figure 10 illustrates preference based on color and typography.

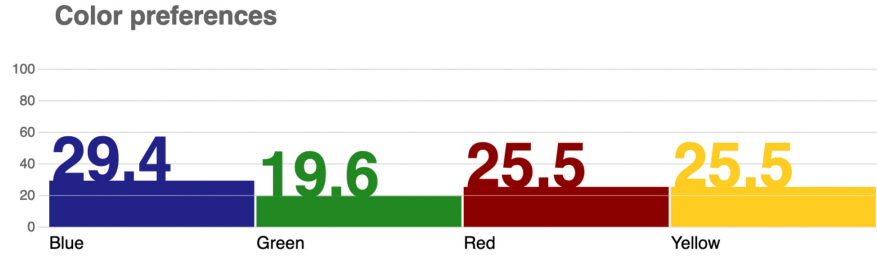


Figure 10: *preferences of color /typography choice.*

Race demographics:

For preferences of imagery on the packaging, roughly half (50.1%) respondents preferred packaging with no imagery at all, just graphics. The most preferred imagery was the mixed-race family imagery (19.6%), followed by the non-white family imagery (17.6%) and the white family imagery (12.7%) being the least preferred imagery on the package. Figure 11 illustrates the average responses of all subjects.

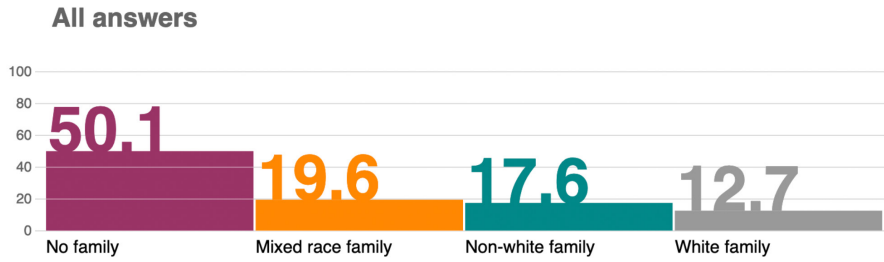


Figure 11: *preferences of human imagery of all respondents*

As noted earlier, there was concern with the high percentage of white respondents and the potential to skew the results. When the data was broken down between those who identified as white and those who did not, the differences in imagery preference was not very significant. In this case, no imagery was still preferred (49.4% white vs 52.6% non-white), followed by the mixed-race family imagery (19.3% white vs 21.1% non-white), the non-white family imagery (18.1% white vs. 15.8% non-white), with the least preferred imagery of the white family (13.3% white vs. 10.5% non-white). Figures 12, 13 illustrate the breakdown of white vs. non-white responses from subjects.

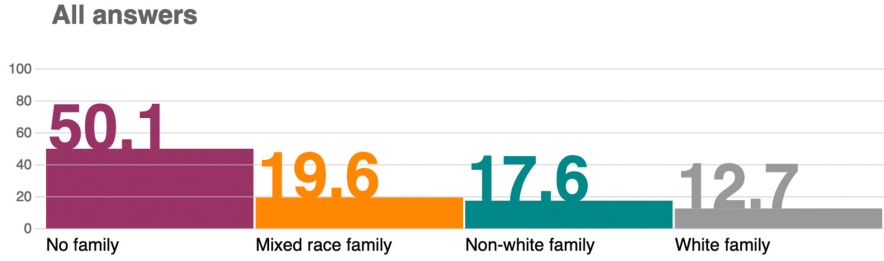


Figure 12: *white respondents*

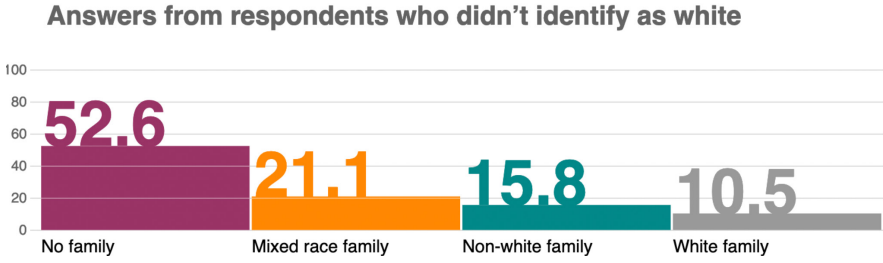


Figure 13: *non-white respondents*

Gender demographics

When the results were broken down between participants who identified as female and male, there were interestingly similar results to the race demographic responses (Less than 2% of the participants didn't identify as male or female.). There was a strong preference for the no-family imagery (50% for women, vs. 47.1% men), and the trend for mixed-race, non-white and white family imagery is similar to the race

demographic (as illustrated in figures 14, 15). Interestingly, there is a higher percentage of preference for mixed-race preferred by men (23.5% vs 17.6% women) and non-white family imagery (23.5% men vs 19.1% women).

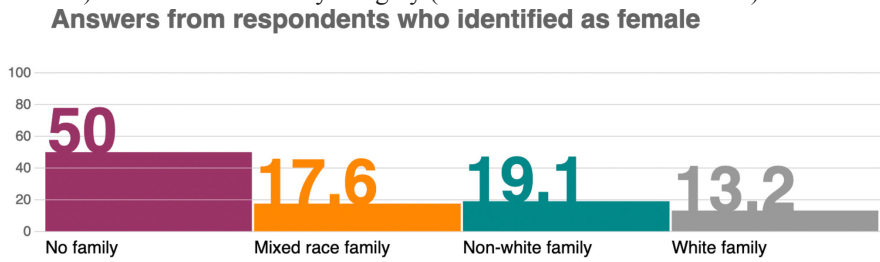


Figure 14: *female respondents to imagery*

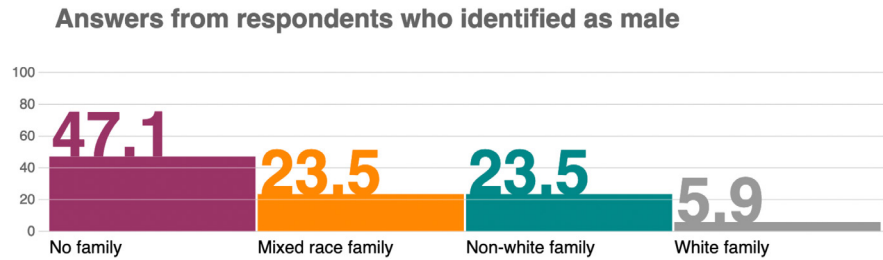


Figure 15: *male respondents to imagery*

The biggest difference in results were found in the age groups. The younger the respondents, bigger was the preference for the "no-family" imagery in packaging. For example, the ages 18-24 saw a preference of 63.6% of no imagery (just graphics). This age range saw a similar trend in preference to race and gender; after no imagery, the preference was mixed-race (21.2%), non-white family imagery (9.1%) followed by white family (6.1%). Figure 16 illustrates the breakdown of preferences for the 18–24-year-old range. The 25-40 age range respondents again preferred similar packaging with the strongest preference of no imagery (52.4%), then the mixed-race family imagery (19%), then the non-white family imagery (14.3) and the white family imagery (12.5%). Although this age range had roughly double the preference of the white family imagery compared to the 18–24-year-old group, it was still the least preferred overall (see figure 17). Where a shift is noticed is in the age range of 41-56, where for the first time there is a preference of the white family imagery (19.4%) over the non-white family imagery (16.1%) and the mixed-race family imagery (12.9%). Figure 18 illustrates the results of the 41-56 year age range. Perhaps the most interesting and significant shift in imagery preferences is the 57 to 66 year age group. This age group showed the most different result, with more than half choosing the non-white family imagery layout (58.3%), and less than 10% choosing the no-family imagery layout (8.3%) or the white family one (8.3). Figure 19 illustrates the preferences of imagery for the 57-66 age group. Less than 5% of the respondents were older than 67 years old.

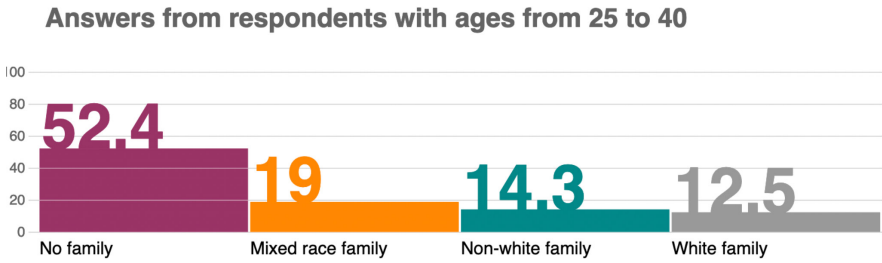


Figure 17: *25-40 year age range respondents to imagery*

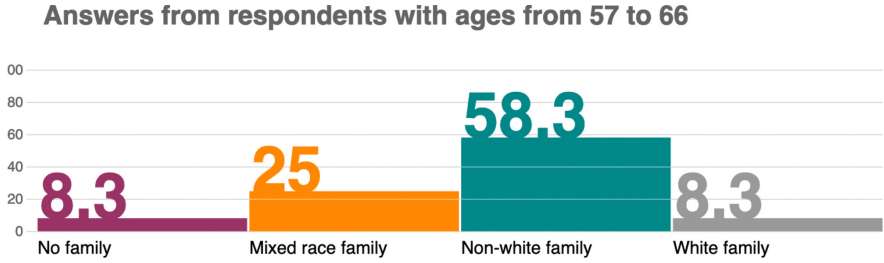


Figure 18: *41-56 year age range respondents to imagery*

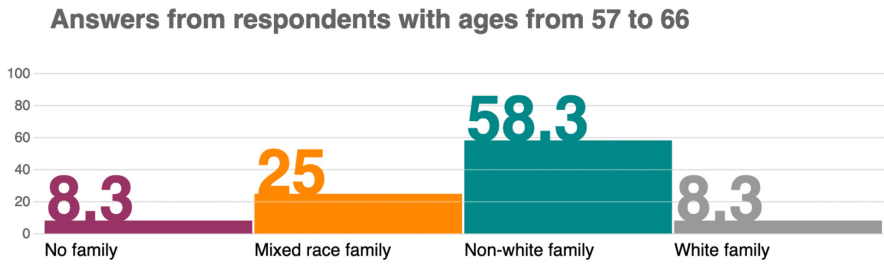


Figure 19: *57-66 age range respondents to imagery*

Perhaps some of the most notable results were from the commentary that was included with subjects' submissions. The majority of the subject comments concurred with the data – subjects preferred "product imagery" or "graphics only" as the preferred packaging. In total there were 34 comments to the survey, with 21 expressing preference to "no human imagery" (62%). Other comments had to do with color preferences (as noted above, color was not a strong predictor of preference).

Some excerpts from the comment section:

"Would prefer a cut out to see the product"

"Illustration is better than photography for product packaging."

"I'd rather see what the pasta looks like inside than see an image of the family eating the pasta."

"I prefer pasta packaging without photography of other people."

Conclusion:

For this research survey on human imagery in food packaging (specifically pasta packaging), the conclusion can be drawn that human imagery – imagery that deliberately shows a variety of family races – does not have a significant impact on subject preference. Where there was strong preference for the packaging were the graphics, or product images. Color also had little bearing on subject preference.

The one area of this study that the researchers are hesitant to draw conclusions is the preference based on age demographic. One could argue that for the 18-24 year old age demographic, these subjects are more likely to pay attention to design trends on social media platforms, and respond to appropriate graphic design. On the other hand, the preference of the 57-66 age group which responded strongly to the nonwhite family imagery should be answered with additional research.

In no case, with any demographic including race, age, or gender, did white family imagery show as a preference. This research would imply that for brands who package food products such as pasta (and other fast moving consumer goods), that human imagery is not a factor when consumers show preference of a brand, nor is color. This research strongly shows that "graphics only", or designs that don't contain human imagery show preference.

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