

## **Consumer Perception and Food Packaging**

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*Color in food packaging may influence consumer perception of various factors of health of the food product. If lighter colored food packages are seen as healthy, people who are concerned about health will purchase these products. In this study, fifty participants were asked to answer questions about food products based on the packaging color. There were four trials of products, all of which contained three packages that were colored red, green, or light blue. Ultimately, products that were lighter in color, i.e. light blue, were indicated as being the healthier products.*

The purpose of this study was to determine whether the colors used in food packaging alter consumer's conceptions about food products. Previous researchers have shown that specific colors may affect consumer's expectations of the food or drink product. According to this research, changing the color of the package could change the desirability of a product. In a study conducted by Tom, Barnett, Lew and Selmants (1987), color was found to indicate such things as temperature, weight, and flavor of food or drink. Consumers also used color cues to identify the brands of products. The conclusion of this study was that marketers should consider the importance of color-choice in the packaging of their food products in order to promote the sale of their products.

According to a study done by Kaya and Epps (2004), certain colors have been associated with different meanings. For example, black is the color of power, white of

purity and cleanliness, red the color of energy, blue exudes calmness and green is the color of nature, growth and money. Putting this color psychology to use, marketers can send a positive or a negative message about their product by the color used in their packaging.

An example of this phenomenon was cited in a paper written by Gorn, Chattopadhyay, Yi and Dahl (1997) in which they stated that although it is known that color choice is important, managers do not always take that into account. They cite an example in which the color of the packaging used for Nabisco's Honeycomb Graham Snacks was blamed for the poor sales of the product and that the company changed the coloring of the packaging and re-launched the product with greater success.

In a study conducted by Alley and Alley (1998), there was some evidence that the color red may increase the perceived sweetness of a product whereas green and yellow may have the opposite effect. A study done by Koch and Koch (2003), suggests that few colors are associated with preconceptions of taste, however red and green did show patterns of associations with taste.

The hypothesis in our study was that food products packaged in light blue would be selected as healthier food choices than those food products that are packaged in the darker colors, red and green. This research may benefit the food marketers and product manufacturers when they are marketing products that they want to be perceived as a healthy choice. Forty subjects from Lindenwood University and ten subjects from outside sources were given six questions concerning their perceptions of the healthiness of food products based on the color of the package. They each answered the same six questions for four different sets of packages.

## Method

### *Participants*

In this experiment thirteen subjects from the Lindenwood University Human Subject Pool (HSP) were used, twenty-five subjects were from Dr. Kelly's Human Sexuality class, and the remaining twelve subjects were all from various undergraduate institutes. All of the subjects that were allowed to participate were at least eighteen years of age and undergraduate students. The participants from the HSP were recruited from introductory psychology, sociology, and anthropology classes through a description and signup sheet located on the HSP bulletin board on the fourth floor of Young Hall across from the restrooms. The HSP subjects were given bonus points in their respective courses for participating in the experiment, and the other subjects were not given any compensation for their participation. All of the researchers were female and participants were tested by two female researchers.

### *Materials*

This experiment required the use of a desk, three chairs, pen, pencil, eraser, data sheet, interview questionnaire, and generated stimuli. The desk was used to display the generated stimuli and separate the participants from the researchers, allowing the researchers to record data on the data sheet without the participants directly viewing the data sheet. The three chairs were used for the experiment, two on one side of the desk for the researchers to sit on, and one on the opposite side, for the participant to sit on. A pen, pencil, and eraser were all used by the researchers to record data on the data sheets. A data sheet and interview questionnaire was used for each individual participant. The questionnaire and the data sheet can be found in Appendix A and B. The subjects that

were not a part of the HSP were all given a questionnaire that they completed individually upon presentation of the stimuli, which can be found in Appendix C.

There were two categories of generated stimuli: boxes and cans. These two categories were further separated into two subcategories of large and regular. Cereal boxes of the same height and weight (17oz.) were used as large boxes, cracker or snack food boxes of the same size, width, and weight (11oz.) were used as small boxes. Family size vegetable and soup cans, approximately 24 ounces, were used as large cans while regular soup or vegetable cans, approximately 15 ounces, were used as the small cans. There were three containers in each category; these containers were colored red, green, or light blue. These containers were not used in their original packaging colors; each container was painted with an acrylic based paint across the front or on the paper label. The fronts of the boxes were the only part painted as the sides were not directly visible to the participant.

### *Procedure*

In this experiment, participants were recruited from the HSP through the bulletin board posted on the fourth floor in Young Hall on the campus of Lindenwood University. After signing up for the experiment, participants were expected to show up to the experiment at their allotted time. The researchers checked the sign up sheets daily to ensure that there were going to be participants for the experiment and to record the names of all participants signed up in case they were absent or needed to be reached.

Once the participants arrived at the designated research site (assigned to them in a room booking through Lindenwood University), they were instructed to sit down across from the researchers. Three objects were presented at a time. To counterbalance the order

in which the generated stimuli were placed across the desk or table was determined by the use of a Latin Square configuration. The order in which the different categories was presented was also determined by the use of a Latin Square. This meant that every other participant began with cans then boxes and vice versa, small or large, as well as the different order of stimuli displayed. With each category displayed, the participants were asked to verbally answer six questions (see Appendix A). The researcher marked each response on the data sheet (see Appendix B). The same procedure was followed for the participants from the other varying universities. However, the participants from Dr. Kelly's Human Sexuality class were all presented with the stimuli at the same time. The same counterbalancing techniques were used in the presentation of the stimuli, but they answered the questions on an individual questionnaire.

### Results

Each of the fifty subjects participated in four trials, and for the purpose of this analysis each of the trials are treated as separate data. Therefore, there are two hundred responses. Upon analysis of data frequencies, light blue was chosen by the participants as the healthiest product 46.4% of the time, as compared to red which was chosen 23.7% of the time and green which was chosen 29.9% of the time. These frequencies suggest that there is a significant difference in the perception of the healthiness of products based on the color of the packaging.

For further analysis of the data, a non-parametric chi-square test was used for each of the questions on the survey (see Table 1). Red was chosen as the product that contained the most fat,  $\chi^2_2 = 51.103, p < .001$ . Blue was chosen as the product with the

least amount of fat,  $\chi^2_2 = 45.969, p < .001$ . There was no statistical difference between red, blue, and green concerning the product with the most sugar,  $\chi^2_2 = .814, p = .666$ . There was no statistical difference between red, blue, and green concerning the product with the least sugar  $\chi^2_2 = 9.938, p = .007$ . Red was chosen as the least healthy product,  $\chi^2_2 = 34.464, p < .001$ . Blue was chosen as the healthiest product,  $\chi^2_2 = 16.00, p < .001$ . Blue was also chosen as the product that would be purchased given the choice between red, blue or green packaging.  $\chi^2_2 = 14.857, p = .001$ .

**Table 1. Results of the Chi-square tests**

	most fat	least fat	most sugar	least sugar	least healthy	most healthy	purchase
Chi-Square(a,b)	51.103	45.969	.814	9.938	34.464	16.000	14.857
df	2	2	2	2	2	2	2
Asymp. Sig.	.000	.000	.666	.007	.000	.000	.001

a 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 64.7.

b 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 65.3.

**Table 2. Chi-square analysis showing relationship between perceived healthiest product color and frequency of purchase**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.592(a)	4	.000
Likelihood Ratio	25.856	4	.000
Linear-by-Linear Association	10.819	1	.001
N of Valid Cases	194		

a 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.43.

In a cross tabulation chi-square analysis of question 5b and question 6 showed that the product color that was perceived to be the healthiest was most frequently the product color chosen to purchase,  $\chi_4^2 = 27.592, p < .001$  (see Table 2).

## Discussion

As hypothesized, the food products packaged in light blue were perceived by the majority of participants to be the healthiest food products when compared to green and red packaged food products. Red packaged food products were perceived as the least healthy. The data also showed that people are more likely to purchase the product that they perceived as the healthiest.

As mentioned earlier, color can be associated with temperature, flavor, and weight of food. The results from this study may show evidence of an association between weight of the product and perceived healthiness. An example can be seen in the results obtained regarding light blue packages and red packages. The lightness of the blue packages may have given a perception of lightness in the weight of the product, which would be perceived as healthy. The darker color of red may have been perceived as a heavy product, which may have been why those packages were perceived as the least healthy products.

Further research may want to include information regarding gender differences. It would be interesting to explore gender differences in food purchase preferences based on perception on healthiness of the products. Another difference that would be interesting to examine is the cultural differences that exist. Different cultures are likely to have different perceptions of the features in food products that make them healthy choices. Also, color preference and perception may culturally based. The student population at Lindenwood University is diverse enough to support an experiment examining cultural differences in relation to color and health perceptions.



The arbitrary labels that were placed on the packages may have affected the participant's perceptions. The boxes that were labeled as cereal may have offered a preconceived notion of healthy or unhealthiness; as would the boxes and cans labeled snack and the large cans labeled soup. If further research on this topic is conducted these labels may be left off in order to reduce preconceived images of certain foods. More interview questions may be needed to find out if people purchase all foods based on healthiness or if healthiness is only looked for in certain products. It is difficult to say if the color light blue was selected as the healthiest food product because of the perceptions that the color gave, or if previous experience with buying healthy food products that were packaged in light blue influenced the participant's choices in this study. Further research using different combinations of colors would be necessary to explore this possibility.

In conclusion, the alternative hypothesis that light blue would be perceived as the healthiest product was supported by the data that were collected. Statistical significance was found in all questions asked in the interviews or questionnaire, except for the question regarding most sugar. The most unexpected conclusion that can be reached from this data was that participants were most likely to purchase the product that they perceived as the healthiest product. This finding could be encouraging to marketers who specifically target health conscious consumers and also to professions in the medical field who put effort into promoting healthy eating as a means of obtaining improved healthfulness.

### References

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## **Appendix A**

### **Interview Questionnaire**

- 1) Which product has the most fat?
- 2) Which product has the least amount of fat?
- 3) Which product has the most sugar?
- 4) Which product has the least amount of sugar?
- 5) Rank products in order from least healthy to most healthy.
- 6) Which product would you purchase?

**Appendix B**

**Data Sheet**

Participant	M/F	Q1	Q2	Q3	Q4	Q5	Q6
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							