

Snack Food Package Design: Exploratory Study on Children's Snack Choices and Design Elements

Sunghyun R. Kang, Iowa State University, Ames, USA, shrkang@iastate.edu
Debra Satterfield, California State University, Long Beach, USA, debra.satterfield@csulb.edu

Nora Ladjahasan, Iowa State University, Ames, USA, nading@iastate.edu

Abstract

Packaging is an essential element of design for both consumers and businesses. Product packaging functions both as a communication tool for product information and for brand messages. In addition, the role of visual elements and messages on snack packages are not well understood. This is particularly true from the standpoint of influencing the selection of snack food in children, even though there has been growth in the economic power of children as a consumer group. Therefore, this study examines: 1) the role of design variables such as typography, images, and the stylistic combination of these visual elements in affecting children's snack food selection; 2) the role of health messages on children's snack food selections; and 3) the role of perceived 'healthiness' in influencing children's snack food selections. Digitally- simulated snack package images were created and sixty children ages 9 to 13 were recruited for this study. From these design variables, 'preferred-selections' and 'perceived healthy-selection' of children in this age group were identified.

Keywords: Package Design, Children, Design Elements, Healthy Snack Choices, Preferred Snack Choices

Many marketing research studies have been conducted that address the important role that packaging plays at the point of sale (McNeal & Ji, 2003, Silayoi & Speece, 2004, Abdalkrim & Abdulaziz, 2013). These studies have shown how packaging communicates the content of the product and influences a consumer's buying decision. Food packaging as a form of communication provides an opportunity to connect with the audience and to convey information that persuades a consumer's food selection (Roberto et al., 2007, Robinson et al., 2010). Because of the growth in the area of children as a consumers group, branding has also been shown to effectively targeted even very young consumers (McNeal and Ji, 2003). Thus, the visual elements of a package are critical in their ability to target both children and adults. They have also been shown to draw attention to the product, create an immediate expectation and generate a sense of importance and trustworthiness in the product. This study builds on earlier work of the authors (Kang et al., 2012, 2016) that focused on the preferred snack selections of children with regard to color and design elements. Additional participants were added to this study and an additional question was added that related to healthier snack choices. This study sought to address the question of which design elements on snack packages promote snack food product selection and how do the health/nutrition education messages affect the selection of snack foods.

The purpose of this second study was to examine the impact of the visual elements on children age 9 to 13 with regard to snack selection and perceived healthfulness. Specifically, this study examines: 1) how design variables such as typography, images, and stylistic combinations of visual elements influence children's snack food selection; 2) how health messages affect children's snack food selection; and 3) how perceived 'healthiness' influences children's snack selections. In this study, visual and verbal elements on snack packages were isolated to identify their role in children's decision-making processes. The results of these studies will be used to create more complex packaging prototypes for further study with regard to healthier snack decision-making.

Study Design and Methods

A survey was conducted with digitally-simulated snack package images shown to children ages 9 to 13. The SoyJoy® snack food brand was selected as the model for the packages, but the name of the product was changed to "Enjoy" except for the verbal message test. Soy products are often perceived as a healthy food, but many consumers do not consider soy to have a good taste (Wansink et al., 2000). Therefore, the SoyJoy® brand name was used for the verbal message test to make a connection between a brand and the brand messages. Computer simulations of package designs were presented for evaluation on a 27-inch monitor in a usability lab. The lab for the study was equipped with audio taping capabilities and screen capturing was done using screen capture software for the data analysis. The data was analyzed using SPSS statistical software version 23. The children were divided into three groups. Group 1 was asked in an open-ended manner to select the package with the contents of the snack "they would prefer to eat (PE)" and in a follow up qualitative question they were asked to explain why they would prefer to eat this snack. Group 2 was asked the same question as the Group 1 children and then asked an additional question about which they perceived as a "healthier snack to eat (HE)" based on the package design elements. Group 3 was asked the same questions as those of group 2 but in the reverse order. For group 3, the PE choice was asked first, and the HE questions followed. This study was approved by the Internal Review Board (IRB) at a State University in the USA and a consent letter from parents and an assent form from the children were both required for participation.

Design of Tested Variables

Ampuero and Vila (2016) identified the key design elements of packaging as color, typography, shapes, and image. Typography, image, healthy messages, and a combination of image and type were tested in this study. Each category is broken down into five variables, and each variable is designed to identify children's decision-making factors. Participants picked the background color of the package which they indicated was the color of the package of product that they would most like to eat. Green, yellow, red, pink, and blue were selected from the existing SoyJoy® brand. Green, red, and blue were equally selected by the children in the study as a color they would prefer to eat (Kang et al, 2012, 2016).

Typographic Variables

Sans-serif types were used for headlines and titles. Five different type attributes were created to study how typographic variables influenced the decision on the preferred snack and perceived as healthy snacks. Table 2 shows sample designs with different type weights, decorated type with shadow and gradation color, 3D type and undulating type respectively.

Table 1. Type Variables

T1	T2	T3	T4	T5
				
Light Weight	Normal Weight	Drop Shadow + Color Gradation	3D Type	Undulating Type

Image Variables

Photographic images and graphic images were created to examine their influence with regard to children's decision on the preferred snack and perceived healthy snacks (Table 2). The same typeface is used with the five different variables.

Table 2 Image Variables

I1	I2	I3	I4	I5
				
Random Lines	Brand Graphic	Ingredient Photo	Product Photo	Ingredient & Product

Stylistic Combination of Design and Typographic Variables

A study reported that 69 percent of supermarket food for children in Canada contains a cartoon image or childish typefaces on the front of the box (Elliott, 2012). A set of complex design and typographic variables (Table 3) were created to identify their impact on the children's decision-making compared to the simple variables shown in table 1 and table 2. Two typefaces and product photos and cartoon images were created to observe the decisions.

Table 3. Combination of Design and Typographic Variables

V1	V2	V3	V4	V5
				
Normal Type & Product Photo	Decorative Type & Product Photo	Decorative Type & Brand Graphic	Decorative Type & Cartoon Character	Decorative Type & Cartoon Character & Brand Graphic

Information Verbal Messages

Table 4 shows the messages that were presented to the participants. The messages in B2 are “Real Fruit, Whole Soy, All Joy,” the message in B3 is “Baked whole soy,” the messages in B4 are “Rich Fiber & Heart Healthy Soy Nutrients,” and the messages in B5 contains all three messages.

Table 4 Information Messages

B1	B2	B3	B4	B5
				
No Message	Ingredient Information	Marketing Message	Healthy Information	All Message

Results and Discussion

The “preferred snack data to eat” from the group 1 and 2 data (n=40) were not affected by the question related to healthy snack choice. The group 3 data (n=20) were affected by the question related to preferred snack to eat because of the reversed order of questions. The “healthier snack choice to eat” data from group 2 (n=18) was influenced by the “preferred snack data to eat” due to the order of the questions.

Participants

A total of sixty children were recruited through email and word of mouth for this study. Table 5 shows the number and gender of the participants in each group. A total 22 children participated in the first group (n=22), the second group (n=18), and a total 20 children, 12 boys, and eight girls, participated in the third group.

Table 5. Participant

	Boys	Girls	Total
Group 1	12	10	22
Group 2	8	10	18
Group 3	12	8	20
Total	32	28	60

Typographic Variables

Table 6 shows the preferred type choices to eat. The typographic style (T3) with normal weight, drop shadow and color gradation effect in the inside of the letter was selected by 22 children (55%) followed by normal weight with undulating typographic style (T5). The data shows that the order of the questions influenced the children’s choice of preferred snack to eat by the healthier snack choice. The group 3’s “preferred to eat” choice with typography was mixed compared to group 1 and group 2. The reason for selecting the T3 package design for PE varied, but 14 (35%) children out of 40 reported that they responded to the visual elements that grabbed their attention. Table 7 shows the HE selections with the typographic variables.

Children perceived the typographic style with lightweight as a healthy snack for both group 2 and 3. Some children could not make the decision between T1 and T2 in group 2 after the PE question. Children in the group made the healthy snack choice before the preferred snack selection. About half of children perceived the light weight type as a healthier snack choice followed by normal weight type. There were no significant differences between gender and ages.

Table 6. Preferred Selection with the Typographic Variables

		Group 1 and 2		Group 3	
		Frequency	Percent	Frequency	Percent
Valid	T1	4	10.0	2	10.0
	T2	1	2.5	4	20.0
	T3	22	55.0	5	25.0
	T4	4	10.0	4	20.0
	T5	9	22.5	5	25.0
	Total	40	100.0	20	100.0

Table 7. Group 2 and 3: Healthy Snack Selection with the Typographic Variables

		Group 2		Group 3	
		Frequency	Percent	Frequency	Percent
Valid	No Answer	1	5.6	0	0
	T1	5	27.8	10	50.0
	T1, T2	2	11.1	0	0
	T1, T3	1	5.6	0	0
	T2	4	22.2	3	15.0
	T3	3	16.7	2	10.0
	T4	2	11.1	2	10.0
	T5	0	0	3	15.0
	Total	18	100.0	20	100

Image Variables

Table 8 shows that sixty percent of children chose the dynamic line graphics (I1) followed by a photo of realistic ingredients (I3). The reasons for selecting I1 related to its visual attraction. The children described with phrases such as “it is cool,” or “It is eye catching.” The data shows that the participant children in this study were interested in dynamic visual movement. None of the children chose the I2 package, which does not include any illustration or photographs.

Table 8: Preferred Selection with the Image Variables

		Group 1 & 2		Group 3	
		Frequency	Percent	Frequency	Percent
Valid	I1	24	60.0	8	40.0
	I1, I5	1	2.5	0	0
	I2	0	0.0	6	30.0
	I3	11	27.5	2	10.0
	I4	4	10.0	4	20.0
	Total	40	100.0	20	100

Group 2 who answered PE first chose the package with a photo of ingredients and product (I5) as an HE, while Group 3 who answered the HE question first chose the I3 (Table 9) followed by I5. This data shows that when children saw the fresh fruit, they perceived it as a healthier snack than those with graphical images. There gender-related differences when choosing their preferred and healthier snack choice.

Table 9. Group 2 and 3: Healthy Snack Selection with the Typographic Variables

		Group 2		Group 3	
		Frequency	Percent	Frequency	Percent
Valid	I1	0	0	3	15.0
	I2	0	0	1	5.0
	I3	8	44.4	9	45.0
	I4	1	5.6	2	10.0
	I5	9	50.0	5	25.0
	Total	18	100.0	20	100.0

Stylistic Combination of Design and Typographic Variables

About twenty-eight percent of children selected stylized text with a simple graphical image (V3) as the PE. A plain text with a cartoon character (V5) was selected as the second ranking, however, the data is not significantly different with regard to the other designs (Table 10). Boys and younger children preferred the package with a cartoon character. The data indicates that the cartoon character was not seen as attractive and it should be reconsidered for future study, while, forty percent of children chose the V3 as the PE after the HE choice. Forty-five percent of children in Group 2 chose plain text with a product photo as an HE followed by V3, while, forty percent of children in Group 3 chose the V3 (Table 11). This data indicates that when a design is simple, children perceived it as a healthier snack.

Table 10: Preferred Selection with the Combinations of Types and Images

		Group 1 and 2		Group 3	
		Frequency	Percent	Frequency	Percent
Valid	No Answer	0	0	1	5.0
	V1	6	15.0	3	15.0
	V1, V2	1	2.5	0	0
	V2	7	17.5	3	15.0
	V3	11	27.5	8	40.0
	V4	7	17.5	3	15.0
	V5	8	20.0	2	10.0
	Total	40	100.0	20	100.0

Table 11. Group 2 and 3: Healthy Snack Selection with the Combination of Types and Images

		Group 2		Group 3	
		Frequency	Percent	Frequency	Percent
Valid	No Answer	0	0	1	5.0
	V1	9	45.0	3	15.0
	V2	3	15.0	3	15.0
	V3	6	30.0	8	40.0
	V4	1	5.0	3	15.0
	V5	1	5.0	2	10.0
	Total	20	100.0	20	100.0

Information and Messages

About fifty-eight percent of children in Group 2 and 3 chose the package with ingredient information, a health message and a marketing message (B5). Also, forty-five percent of children chose B5 as a snack they would like to eat (Table 12). This data shows that children also read the labels and are seeking information about the product. None of the girls preferred the package with the ingredient information package (B2). Also, the majority of children chose the package with all three pieces of information (B5) as a healthier snack (Table 13).

Table 12: Preferred Selection with Information Messages

		Group 1 & 2		Group 3	
		Frequency	Percent	Frequency	Percent
Valid	B1	4	10.0	1	5.0
	B2	2	5.0	4	20.0
	B3	7	17.5	1	5.0
	B4	4	10.0	5	25.0
	B5	23	57.5	9	45.0
	Total	40	100.0	20	100.0

Table 13. Group 2 and 3: Healthy Snack Selection with Information Message

		Group 2		Group 3	
		Frequency	Percent	Frequency	Percent
Valid	No Answer	1	5.6	0	0
	B1	0	0	0	0
	B2	0	0	3	15.0
	B3	1	5.6	2	10.0
	B4	1	5.6	0	0.0
	B5	15	83.3	15	75.0
	Total	18	100.0	20	100.0

Limitation of Study

This study was conducted in the United States in a largely middle class, Midwestern college town. Therefore, these finding may not adequately represent other demographic groups. Another limitation of this study is that the snack packages were digitally-simulated, this may influence the children's decision because it didn't allow for tactile sensations and interaction with the package both of which may affect the decision-making process. Also, the test environment in a laboratory setting could influence children's decision-making processes compared to an actual purchasing environment. In addition, this study was limited to researching only five design variables. This study did not consider the child's prior experience with this type of snack food or their preferences with regard to snack food types.

Conclusion and Future Study

The goal of this study was to analyze which visual elements on snack food packages impact the decision-making process in children ages 9-13. This study found that playful and decorative type styles appealed most to the children when asked to select a snack to eat. The light weight type style was perceived as a healthy snack. The package with a dynamic image followed by with a photo that visually represents its ingredients was selected as a snack that children preferred to eat. When children saw a fresh fruit photo on a snack package, they tended to perceive it as a healthier snack. The packages with a cartoon character and a product photo were not selected as a snack that children preferred to eat. Children tended to consider a snack package with simple and clean visual elements as healthier. This study found that children preferred to read the information on the package when choosing a snack to eat even though the message was given a relatively smaller portion of the packaging real-estate. Also, children considered a package with more information on it as a healthier snack than a package with less information on it. The order of the question related 'healthiness' influenced children's snack selections. The recent research mentioned that "any structured and legible presentation of key nutrient and energy information on the FOP [front of package] label is sufficient to enable consumers to detect a healthier alternative within a food category when provided with foods that have distinctly different levels of healthiness" (Hodgkins et al., 2015, p.1652). Because of the interrelatedness of design variables in the package design, it is important to understand that visual elements that play a dominant role in making the visual and

verbal information clearer and more appealing to consumers. The relationship of design variables on snack package designs should be furthered studied to determine how they impact children's decision-making with regard to healthier snack choices. The decision-making process is complicated and includes more factors than just visual design variables. Also, children's behavior within a psychological framework should also be researched to better understand more of the factors that their decision-making process. In addition, design variables are interrelated in the context of a whole design. Therefore, it is critical to synthesize which design elements play a dominant role in affecting the overall perception of a snack food package. Future research will also examine the role of visual design on the decision-making process of adults and other demographic groups.

References

- Abdalkrim, G. M. & AL-Hrezat, R. S. (2013). The Role of Packaging in Consumer's Perception of Product Quality at the Point of Purchase. *European Journal of Business and Management*. 5(4), 69-82.
- Elliott, C. D. (2012). Marketing Fun Foods: Analyzing of Supermarket Food Messages Targeted at Children. *Canadian Journal of Communication*. 37, 303-318.
- Frery, C., Johnson, R., & Wang, M. (2004). Children and adolescents' choices of foods and beverages high in added sugars are associated with intakes of key nutrients and food groups. *Journal of Adolescent Health*. 34 (1), 56-63.
- Hodgkins, C. E., Raats, ME, Fife-Schaw, C, Peacock, M, Groppel-Klein, M., Koenigstorfer, J., Wasowicz, G., Stysko-Kunkowska, M., Gulcan, Y., Kustepeli, Y., Gibbs, M., Shepherd, R., and Grunert, K. G. (2015). Guiding healthier food choice: systematic comparison of four front-of-pack labeling systems and their effect on judgments of product healthiness, *British Journal of Nutrition*. 113, 1652–1663.
- Kang, S. R., Satterfield, D., Lasrado, J., Gonzalez, R., Ladjahasan, N., Welk, G., and Wiley, C. (2012). Tailoring Snack Food Package Design to Children as a Health Communication Strategy. P. Israsena., J. Tangsantikul, and D. Durling (Eds). *Proceedings of the Design Research Society 2012: Bangkok*, volume 3, 825–837.
- Kang, S. R, Satterfield, D., and Ladjahasan, N. (2016). Color preference study on snack package design to children as a health communication strategy. I. C. Ivanovid (Ed.). *Proceedings of AIC (International Color Association) 2016*, Santiago: Asociación Chilena Del Color 2016.
- McNeal, J. U & Ji, M. F. (2003). Children's Visual Memory of Packaging. *Journal of Consumer Marketing*. 20(5), 400-427.
- Roberto, C., Baik, J, Harris, J., & Brownell K. (2010). Influence of Licensed Characters on Children's Taste and Snack Preferences. *Pediatrics*. 126 (1), 88-93.
- Robinson, T., Borzekowski, D., Matheson, D., & Kraemer, H. (2007). Effects of fast food branding on young children's taste preferences. *Archives of Pediatrics & Adolescent Medicine*. 161 (8), 792-97.
- Sebastian, R., Enns, C., & Goldman, J. (2009). US adolescents and MyPyramid: associations between fast-food consumption and lower likelihood of meeting recommendations. *Journal of the American Dietetic Association*. 109 (2), 226-35.

Silayoi, P. & Speece, M. (2004). Packaging and purchase decisions: An exploratory study on the impact of involvement level and time pressure. *British Food Journal*. 106(8), 607-628.

Wansink, B., Park, S., Sonka, S., & Morganosky, M (2000). How soy labeling influences preference and taste. *International Food and Agribusiness Management Review*. 3, 85-94.

Author Biography

Sunghyun Ryoo Kang

She is professor in the Department of Graphic Design at Iowa State University. She received a B.F.A. degree in the field of applied arts from Ewha Womans University in Korea. She earned an

M.F.A. degree in graphic communication from the University of Houston and then taught graphic design in Korea for nine years. She earned an M.A. degree in graphic design from Iowa State University and joined the faculty of the Department of Art and Design at Iowa State University in 2000. She has an extensive research and publication background in the areas web design for visual communication and usability, design evaluation, design for diverse users and teaches undergraduate and graduate courses for BFA and MFA programs.

Nora Ladjahasan

Nora Ladjahasan is an Assistant Scientist IV at Institute for Design Research & Outreach at Iowa State University (ISU). She is also the CDDIAL program coordinator, a program at ISU Community & Economic Development Extension that works with communities and local organizations/agencies on economic and social issues utilizing community surveys and other secondary data analysis. She has a PhD candidate in Rural Sociology at ISU and obtained master degrees in Community and Regional Planning at ISU and Bangkok, Thailand. She has conducted several program evaluations in the college, and other faculty/staff evaluations in relation to promotion and other administrative positions. She is currently assisting the College of Design faculty/staff with their researches, and graduate students for their thesis. Her involvement ranges from IRB (Institutional Review Board) applications, development of survey materials, sampling design, data collection techniques, data analysis up to result interpretations. She also gives lectures to research design classes discussing the importance IRB teaches research methodology. She has been working with faculty on their researches doing both qualitative and quantitative data analysis. Faculty researches ranges from issues related to color, autism, student health center design, prison design, snack food packaging design, food experiences, web design and the like.

Debra Satterfield

Debra Satterfield, Associate Professor of Design, California State University Long Beach, has extensive research and publication in design for social inclusion, design for behavioral change and the design of educational learning experiences for children with cognitive and physical disabilities. She has published this work through the International Society for Autism Research (INSAR), the Design Research Society (DRS), the International Association of Societies of Design Research (IASDR), and Interaction Design and Children (IDC). She is conducting research on user participatory design for and with children with autism spectrum disorders.

She is also currently researching non-cognitive factors that influence time to graduation for university students and is a researcher on the High Value Degree Initiative, a California state initiative to improve 4-year graduation rates for students at state universities. She teaches in the BA program at CSULB and offers courses in introduction to user experience design and “Research Methods for Inclusive UX Design.”