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Designing Food Packages to Attract Customers: A Systematic Approach

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Abstract

Packages are considered an influential tool used to sell food products by communicating certain marketing messages to attract customers and influence their purchasing decision. This paper presents a systematic approach to design food product packages capable of delivering marketing messages intended to attract customers. The approach begins by identifying the main marketing messages that need to be communicated to customers. Next, perceptual maps relating customers' preferences toward existing or new package designs are constructed to assess the package's effectiveness in delivering the marketing messages. After that, package design characteristics capable of embodying the marketing messages are identified and used as design factors within a conjoint analysis study to design new packages. The applicability of the approach was tested by designing new flavored milk packages. The results of the study showed that the approach allowed package designers to systemize their analysis of the effectiveness of food package designs in delivering the intended marketing messages, and to identify main design factors to be considered when designing a new package, and to use these design factors to develop package designs capable of attracting customers.

Keywords: food package design, new product development, package marketing messages, flavored milk, willingness to buy;

1. Introduction

Food packages play a major role in marketing through the messages communicated by the package allowing consumers to instantly recognize products through distinctive shapes, branding, and labeling. Thus, food packages are considered an important communication tool that increases product visibility and sets it apart from its competition. A package can also lead to marketplace differentiation due to its ability to convey relevant product information that influences consumer's perception, preference, and choice (Becker et al, 2011; Sundar & Noseworthy, 2014). Packaging has an important role in influencing in-store purchase, especially for food products where purchase decisions are characterized by low involvement and impulsive processes (Rebollar et. al, 2012).

The marketing function of food packages implemented through its visual appearance is well recognized by practitioners who investigated the effect of several design attributes related to visual appearances such as the material used which was found to have an influence on the way in which consumers perceive the product and the ideas that they generate about its characteristics (Mutsikiwa&Marumbwa, 2013, Magnier&Schoormans, 2015). The image displayed on the product package is another key element of its visual appearance and was found to have a significantly greater effect on influencing the evaluation of products than other elements (Chrysochou&Grunert, 2014; Ampuero& Vila, 2006). Additionally, the images displayed have a strong effect on emotional responses (Lang et. Al., 1993), unconscious responses (Larsen et al., 2003), and affect a range of consumer reactions, such as attitudes about the package and beliefs about some sensory attributes such as taste (Underwood & Klein, 2002). The verbal cues used to communicate a message or an idea to the consumer is considered a key element in the design of a food package (Machiels&Karnal, 2016; Kauppinen-Räisänen et. al., 2012). The typeface used was found to influence consumer responses and perceptions (Henderson. et. al., 2004, McCarthy and Mothersbaugh, 2002). Package color also affects consumers' willingness-to-buy (Robollar et. al 2012) as it was found capable of conveying different messages, such as price, quality, gender, and age (Klimchuk&Krasovec, 2012; Plasschaert; 1995), color was also found capable of differentiating products (Garber et. al., 2000), grab consumers' attention (Klimchuk&Krasovec, 2012), and is related to consumers' emotional responses (Gao & Xin, 2006). The effect of the interaction and the combination of these design attributes has been studied by several researchers. For example, some studies addressed the effect of the combination of color and shape (Becker et., 2011). The effect of these design attributes and their interaction may vary according to the product which the package contains and the target customer base it addresses.

The existing literature provides food product package designers with a wealth of useful information to consider when designing a new package. However, using this information relies to some extent on the designer experience

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and prior knowledge with respect to the effect of some visual characteristics of the package. The two major approaches adopted by researchers when investigating the effect of package design on consumers can be characterized as being atomistic or holistic. The atomistic approach deals with packaging as a group of individual elements, such as color, imagery, shape, size, and typeface (Underwood, 2003). Consumers are thought to evaluate each individual packaging element separately, which in turn affects their overall response towards packaging or evaluations towards the product (Becker et al., 2011). The holistic approach views packaging as a bundle of elements that are blended into a holistic design (Orth &Malkewitz, 2008). Researchers in both approaches usually investigate a handful of attributes at a time, since increasing the number of attributes will increase the number of factors and levels per factor that needs to be analyzed which complicates conducting the required experiments and may lead to uninterpretable results. Additionally, the current literature does not include a systematic approach that can be used by food package designers to identify the most important package attributes that affect customer choice and predict customer willingness-to-buy.

This paper proposes a systematic approach that builds on existing methods and techniques to elicit the messages intended to be delivered to consumers through food package design and assesses the package design success in communicating the elicited messages. In addition, the proposed approach allows the designers to simulate the effect of varying some package design attributes on customer willingness-to-buy. In summary, the aim of this work is to provide a systematic approach for food product package designers that can be used to:

- Analyze package design attributes' effect on consumer willingness-to-buy.
- Identify actionable package design factors capable of communicating the messages intended by package designers or product owners.
- Propose new product package designs that have a high willingness-to-buy.

2. New Food Package Design Approach

A four-step approach is introduced to design new food packages. The approach (Figure 1) starts with determining the marketing messages that need to be delivered to customers, then the effectiveness of current or new package design concepts in delivering the marketing messages are assessed in step 2. Package design factors capable of embodying the intended marketing messages will be selected in step 3 and used in step 4 to design new food product packages.

Step 1: Determine Marketing Messages

Marketing messages are a set of important information which are believed to be capable of attracting customers and influencing their purchasing behavior. Determining marketing messages requires understanding the target audience's needs by conducting market studies to investigate the factors influencing customers' purchasing decisions. Market studies usually result in determining a set of product attributes used by customers to evaluate different alternative products. Product developers need to ensure that these attributes are incorporated into the product design and select an appropriate communication method to convey their existence to customers. For example, customers considering food products could be interested in the product's nutritional value, thus product developers may deliver this message by displaying the nutritional value information using text. Product developers can use different methods to conduct market studies and determine the marketing messages intended to be delivered to customers through package design (Ulrich and Eppinger, 2015). These methods include – but are not limited to-:

- Customer market surveys: customer's needs and reasons for purchase are investigated by conducting interviews, or using questionnaires.
- Expert panels: the opinions of market experts and product sellers are investigated and used to determine the main marketing messages.
- Reviewing major and relevant trade magazines: product reviews and critiques published in trade magazines can form the basis for determining the main marketing message.

The result of this step is a list of marketing messages that need to be delivered to customers through the package design.

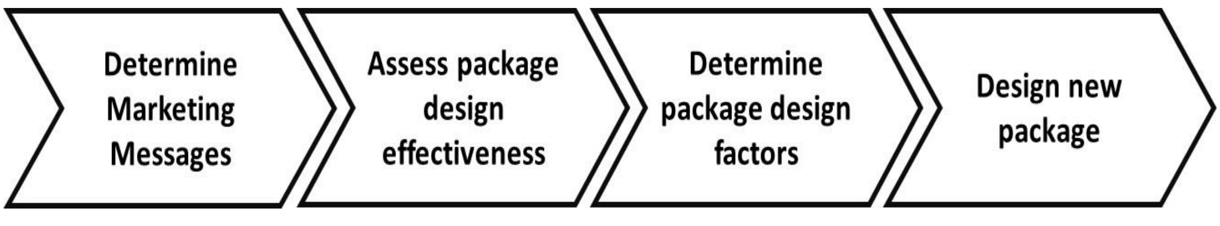

Figure 1. Food package design approach

Step 2: Assess Package Design Effectiveness in Delivering the Marketing Messages

Product developers may consider various design concepts to deliver the required marketing messages. These concepts could be based on existing product package designs or novel ideas to deliver the messages. In both cases, it is essential to assess the package design effectiveness in delivering the marketing message. It should be noted here that a product package design could communicate several marketing messages, and these messages might be well received by customers, but this does not guarantee that customers will purchase the product. Thus, it is equally important to determine the impact of these marketing messages on customers' purchasing decisions. This step will focus on determining the effectiveness of the package design in delivering the marketing messages, and the impact that these marketing messages have on customers' purchasing decisions.

Marketing messages identified in the previous step will be structured using the Semantic Differential Method (Morrow et. al. 2015), which consists of two pairs of bipolar adjectives (opposite meaning) anchoring both sides of a Likert Scale, to build a semantic space based on the subjective perceptions of customers thus facilitating the process of exploring how well the message intended is received by target customers. In addition; a preference attribute representing the willingness-to-buy will be included in the assessment. This analysis will be conducted by developing a "joint-space" attribute-based perceptual map that combines both customer perceptions and preferences (Lilien et. al., 2017).

A joint-space map (Figure 2) is a perceptual map showing the relative position of competing objects plotted in Euclidean space (Kardes 2010, Kwon et. al. 2011). Each point on the map represents one object. Two points near to each other indicate that there are similarities between the objects. The axes of the map are assumed to denote the underlying dimensions used by respondents to form perceptions and preferences for an object. The perceptual map will be diagrammed using Correspondence Analysis; a multidimensional scaling interdependence technique for dimension reduction and perceptual mapping (Malhotra et. al. 2017, Greenacre 2016, Beh& Lombardo, 2014). The input data for the analysis are in the form of a contingency table indicating a qualitative association between the rows (e.g. attributes) and columns (e.g. objects). Correspondence analysis scales the rows and columns in corresponding units so that each can be displayed graphically in the same low-dimensional space. These spatial maps provide insights into (1) similarities and differences within the rows with respect to a given column category; (2) similarities and differences within the column categories with respect to a given row category; and (3) relationship among the rows and columns. Correspondence analysis results in the grouping of categories (activities, brands, or other stimuli) found within the contingency table. The results are interpreted in terms of proximities among the rows and columns of the contingency table. Categories that are closer together are more similar in the underlying structure. Joint-space maps can be generated by two methods: averaged ideal-point and averaged vector models (Lilien et. al., 2017). In the averaged ideal-point map, a hypothetical ideal object is added to the set of alternative objects that customers are asked to rate. That is, customers are asked to indicate where their ideal object would fall in terms of the different attributes; the farther an object is from the ideal object, the less it would be preferred by customers. The averaged vector model adds a preference attribute to the set of attributes that will be rated by customers and will appear as a vector on the perceptual map indicating the direction of increasing preference. The farther an object appears along the preference vector, the more it is preferred, and other attributes that are closely aligned with the preference vector can be interpreted as drivers of explanations for customer preference.

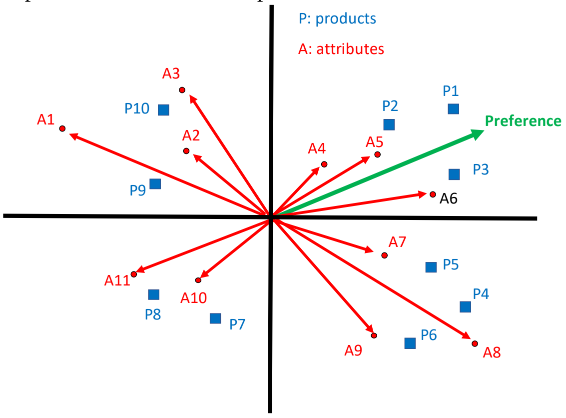

Figure 2. Joint-Space Perceptual Map

This step will generate a joint-space perceptual map showing customer perceptions with regards to the marketing messages communicated through product package designs, and the preferences that customers have with respect to each product rated. For example, Figure 2 shows a joint-space perceptual map showing customer perceptions towards 10 products with respect to 11 attributes and a preference attribute. The map can be interpreted to identify the following:

- Product similarity assessed through product proximity. For example, products P1 and P2 have close proximity indicating that they are perceived as similar products by customers, while products P1 and P7 are farther apart indicating that they are perceived as dissimilar.
- Attribute correlations assessed through the angle between the attribute vectors. Acute angles represent a positive correlation between the attributes, while right angles indicate a lack of correlation and obtuse angles indicate a negative correlation. Correlated attributes could be combined into one attribute. For example, attributes A4, A5, and A6 are correlated attributed and could be combined into one attribute if needed.
- Product performance with respect to the different attributes as indicated by the position of the product with respect to the attribute vector. The farther the product on the attribute vector, the better the perceived performance of the product. For example, product P1 has a better performance with respect to attribute A5 than product P2.

Preference analysis as represented by the preference vector indicating the direction of the increasing preference. For example, product P1 is preferred more than product P2. Additionally, the correlation between the preference vectors and other attribute vectors sheds light into what are the main attributes that affect the preference. For example, attribute A5 is highly correlated with the preference attribute, while attribute A3 is not correlated, and attribute A1 is negatively correlated.

The main outcome of this step will be the identification of the influential marketing messages that affect customers' preference and leads to increasing the willingness-to-buy.

Step 3: Determine Package Design Factors

The goal of this step is to identify the package design characteristics that embody the marketing messages in order to use them in the design of new packages. This will be accomplished by analyzing the product package designs along with the marketing messages delivered successfully as identified in the previous step. Common characteristics among the product packages will be considered as the design embodiment features. These features will be selected such that they would be modifiable or actionable by package designers.

The set of actions or modifications applicable to each design features are considered to be the range of values that this feature can assume. That is, the design features identified will be treated as design factors with multiple levels; each level represents a possible variation or action that can be applied to the feature. Thus; this step will result in identifying the set of design factors along with their levels that need to be considered when designing a new product package that can deliver the intended marketing messages.

Step 4: Design New Product Package

The objective of this step is to determine the best product package design capable of delivering the marketing messages. The new package design will be conceptualized using conjoint analysis to assess different combinations of the design factors identified in the previous step and find the optimal combination to maximize customer willingness-to-buy. The procedure followed in this step will be as follows:

1. Develop product bundles

In conjoint analysis, product bundles represent product concepts constructed by varying the combinations of design factor levels of the product under study (Vithala, 2014). Customers' overall evaluation of the bundles will be obtained and will be decomposed into the part-worth that each customer attaches to each level of each factor. The full-profile approach, where full or complete profiles are constructed for all the factors, can be used when the number of factors/levels is small. But once the number of factors increases, it will not be possible nor will it be feasible to ask customers to evaluate all the possible combinations. Thus; the number of product bundles is reduced by using a special class of fractional design called orthogonal arrays which allows for the efficient estimation of all main effects (Lilien et.al, 2017). Orthogonal arrays permit the measurement of all main effects of interest on an uncorrelated basis. These designs assume that all interactions are negligible. Orthogonal designs can be generated automatically by computer packages such as SPSS where two sets of data are obtained: the 'estimation set' used to calculate the part-worth functions for the factor levels, and the 'holdout set' used to assess reliability and validity.

Customer evaluations of the product bundles will be gathered by presenting the customers with a description of each bundle. This description is usually based on listing the attributes and their corresponding levels on cards (i.e. text description), or by showing customers rendered images representing the product bundle along with some description of the features available. Customers will be asked to rate the likelihood of buying each product bundle on a scale of 0 to 100.

2. Determine design factors' relative importance

The part-worth model (Malhotra et. al., 2017) will be used to determine the utility score or part-worth for each factor level. The utility scores are analogous to regression coefficients and provide a quantitative measure of the preference for each factor level where larger values indicate a greater preference. Part-worths have common units and can be added together to give total utility or overall preference for any combination of factor levels. The part-worths can be used for predicting the preference of new product profiles. The goodness of fit of the estimated model can be evaluated using the value of R^2 which will indicate the extent to which the model fits the data.

3. Finalize the new product package design

One of the advantages of using conjoint analysis is its ability to predict the total utility or preference of new designs, this allows designers to simulate customer response to the improvement or design changes made to the current design. New designs will be proposed in this step by selecting a combination of factor levels that will maximize the overall utility or preference of the new product concept while taking into account the feasibility of producing the product economically. The performance of the new product concepts can also be verified by asking the customer to rate the new product concepts (if possible). If these ratings are gathered, then it can be used to double-check the model validity by comparing the results of the simulation with actual consumer responses.

3. Illustrative Example:

The use of the methodology is illustrated using an example for the design of flavored milk packages as shown in the following sections.

Step 1: Determine Marketing Messages

The marketing messages intended to be delivered to customers through the flavored milk package design were identified by a panel of experts consisting of three package designers, two product producers, and two marketing managers. The panel analysis resulted in identifying 12 messages as shown in Table 1. Each marketing message was given a short indicative label so as to be used as attributes in later stages.

Table 1. Marketing Messages

No	Attribute	Marketing Message Description
1	Natural	The package indicates that the product is made from natural ingredients.
2	Rich in Flavor	The package suggests that the product has an intense flavor.
3	Healthy	The package shows that the product contains healthy ingredients.
4	Tasty	The package indicates that the product has a satisfying and indulging taste.
5	Fresh	The package indicates that the product is made from fresh ingredients.
6	Thick	The package reflects that the product is full of ingredients and is not diluted with water.
7	Energetic	The package suggests that the product provides the energy needed for activities.
8	Fun	The package indicates that the product is enjoyable.
9	Attractive	The package makes the product stand out and look appealing.
10	Elegant	The package reflects a stylish appearance.
11	High Quality	The package reflects a high-quality product image.
12	Luxurious	The package indicates that the product reflects a sense of self- indulgence, and pleasure.

Step 2: Assess Package Design Effectiveness in Delivering the Marketing Messages

The marketing messages (attributes) and the willingness-to-buy were structured using the Semantic Differential Method and a set of 19 flavored milk packages commonly found in the local market were selected to be assessed with respect to their performance in terms of delivering the intended marketing messages.

The analysis was conducted by utilizing a survey distributed to a sample consisting of parents who had at least one child aged four years or more. The sample had one hundred and thirty-two participants (approximately 65% female and 35% male, 26 – 46 years old). The participants were shown pictures of existing product packages (see Appendix A). The pictures were edited using Adobe Photoshop® to hide the brand name. Additionally, participants were informed that all products had the same size, the same price, and the same brand. This was done to ensure that these factors will not be taken into account when making the rating. Product package pictures were shown to participants in random sequential order and the participants were given a questionnaire (Table 2) to evaluate the product packages with respect to the selected attributes including the willingness-to-buy on a scale of 1 to 9. The participants were also given the list of marketing messages as described in Table 1 without any further explanation or examples of designs in order not to bias their responses. Participants were interviewed while shopping in three different major shopping malls.

Table 2. Questionnaire

	Preference Rating									
	1	2	3	4	5	6	7	8	9	
Artificial										Natural
Lacking flavor										Rich in Flavor
Unhealthy										Healthy
Insipid										Tasty
Not fresh										Fresh
Thin										Thick
Dull										Energetic
Boring										Fun
Repugnant										Attractive
Poky										Elegant
Low Quality										High Quality
Cheap										Luxurious
Willingness to buy										Willingness to buy
	Absolutely Not								Absolutely Yes	

A perceptual map of the product packages and attributes (i.e. messages conveyed by the package) was constructed using correspondence analysis. The resulting map (Figure 3) showed the perceived similarities/dissimilarity between different product packages along with the attributes associated with these product packages. Initial examination of the map revealed that the attributes could be clustered into three groups:

- Group A contains attributes Fun, Energetic, Attractive, and Elegant.
- Group B contains Natural, Fresh, and Healthy, and
- Group C contains Luxurious, Tasty, Intense, High Quality, and Rich in Flavor.

On the other hand, the product packages formed two clusters. The first cluster was close to attributes in Group A and it had packages with a cartoon image displayed. The second cluster was associated with the attributes in Group B and had a text stating the vitamin content. The rest of the product packages were not clearly clustered into groups which indicate the need for further analysis to identify distinguishing factors. This could be due to the difficulty of analyzing a map with thirteen attributes (conveyed messages) which proved to be cumbersome and even not practical if a designer wanted to identify specific design factors to use. Factor reduction is needed to identify an appropriate number of factors (attributes) capable of retaining most of the information within the map. This was assessed by the proportion of inertia accounted for by each retained dimension or factor as shown in Table 3, were three factors accounted for 70.2% of the inertia. Next, correlated attributes are merged into a single attribute or factor. The merged attributes are named by either using the name of the attribute that has the largest distinguishing power (the farthest point from the origin) or introduce a name that could represent all the correlated attributes. The following factors names were proposed and will be used in the rest of the study:

- Attributes Fun, Energetic, Attractive, and Elegant were combined into one factor named “Childish” to indicate that it is appealing to children.

- Attributes Natural, Fresh, and Healthy are combined into the factor "Natural" indicating the importance of the healthy content which is expected to appeal to parents.
- Attributes Luxurious, Tasty, Intense, High Quality, and Rich in Flavor are combined into one factor called "Rich in Flavor" to indicate the quality and intensity of the taste.

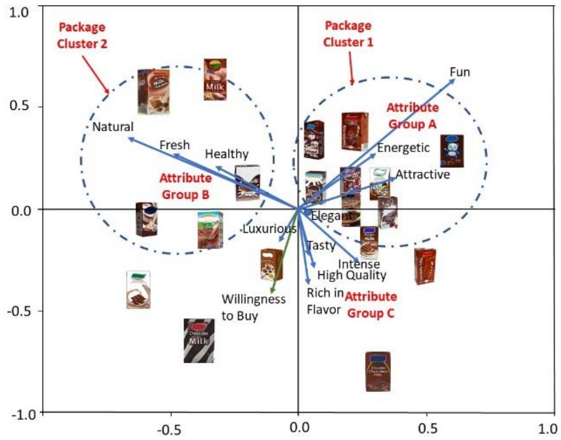

Figure 3. Perceptual map

Table 3. Inertia analysis of the perceptual map

Dimension	Singular Value	Inertia	Proportion of Inertia	
			Accounted for	Cumulative
1	0.103	0.011	0.308	0.308
2	0.091	0.008	0.237	0.545
3	0.074	0.005	0.157	0.702
4	0.054	0.003	0.086	0.787
5	0.052	0.003	0.079	0.866
6	0.040	0.002	0.046	0.912
7	0.035	0.001	0.036	0.947
8	0.026	0.001	0.020	0.967
9	0.022	0.000	0.014	0.980
10	0.020	0.000	0.011	0.992
11	0.015	0.000	0.006	0.998
12	0.008	0.000	0.002	1.000
Total		0.035	1.000	1.000

The data also showed some products (packages 2, 3, 7, 11, 13, 16) had a low willingness-to-buy (less than four), these products will be excluded from the study to reduce the burden of data gathering. The three main factors or attributes representing the marketing messages conveyed by the packages, and the willingness-to-buy attribute will be used to assess the packages once more. This was done by conducting a survey that asked the participants to rate the product packages that had a willingness-to-buy of more than four with respect to the three attributes in addition to the willingness-to-buy using the questionnaire shown in Table 4, and the resulting map was as depicted in Figure 4. The proportion of inertia (Table 5) clearly shows that using three factors accounted for all proportions of inertia.

Table 4. Revised Questionnaire

	Preference Rating									
	1	2	3	4	5	6	7	8	9	
Artificial										Natural
Adult										Childish
Lacking Flavor										Rich in Flavor
Willingness to buy										Willingness to buy
	Absolutely Not						Absolutely Yes			

The resulting map (Figure 4) shows that the products were almost separated into three distinct groups, each group revolved around one attribute. All three attributes (Childish, Natural, and Rich in Flavor) are perpendicular to each other indicating that they are uncorrelated. This highlights that the selected attributes can be used to differentiate products and that each set of products had within them features or characteristics that can successfully deliver the message intended and measured by the attribute. Product packages grouped around the attribute "Childish" had a cartoon image displayed on them, while products grouped around "Natural" had a text that displayed the vitamin content. As for products near to "Rich in Flavor"; they had an image of chocolate bars with a splash of milk. Another characteristic apparent from the map is that the only non-brown product package was separated into its own group, this indicates that brown color influenced consumer choice which is logical since many people associate chocolate with brown color. Finally, willingness-to-buy was found to be correlated with "Childish", which means that consumers would be more willing to buy flavored milk products that convey a message of "Childish".

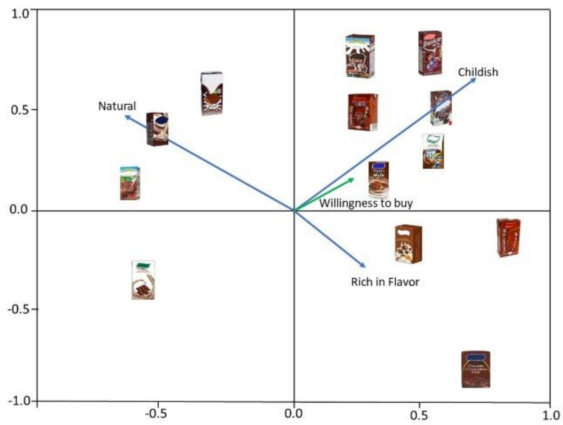

Figure 4. Revised perceptual map

Table 5. Inertia analysis for the revised perceptual map

Dimension	Singular Value	Inertia	Proportion of Inertia	
			Accounted for	Cumulative
1	0.126	0.016	0.548	0.548
2	0.098	0.010	0.333	0.881
3	0.059	0.003	0.119	1.000
Total		0.029	1.000	1.000

Step 3: Determine Package Design Factors

The joint-space perceptual map generated in the previous step was analyzed in this step to identify the package design characteristics that embodied the marketing messages. This was done by examining the package designs and identifying the common package characteristics with respect to the attribute. Doing so revealed that:

- Packages clustered near to "*Childish*" had a cartoon image displayed,
- Packages near to "*Rich in Flavor*" had dark brown color (chocolate color), and chunks of chocolate bars image displayed.
- Packages near to "*Natural*" had a text stating the vitamin content, and the word "Healthy" or "Made with Fresh Milk" displayed on the package.

This analysis provides designers with the main design factors that they need to consider when designing the product package. That is, designers need to decide on: a) which image to display, b) which text to write, and c) which color to use. This means that there are three main design factors to consider when designing the product package, i.e Image, Text, and Color. Next, the levels associated with each factor are determined. The levels are the set of alternatives that each design factor can assume. The factor/level combinations (Table 6) were determined to be as following:

- Image: two images are considered here; a cartoon image and an image displaying chocolate bars, in addition to two more levels which include displaying both images or none.
- Text: a sentence stating "with Fresh Milk" or "Enriched with Vitamin A & D" in addition to displaying both text sentences or none.
- Color: only Brown color was considered since the package deals with chocolate-flavored milk. The levels considered are: Dominant Brown where most of the package will have a brown color, Moderate Brown where about 50% of the package will have a brown color, and Minor Brown where about 25% of the package is brown.

It should be mentioned here that all other attributes or features of the package are kept fixed, this includes the location of text or image when present on the package.

Table 6. Package Design Factors

Design Factor	Levels
Image	Cartoon, Chocolate Bars, Both, None
Text	With Fresh Milk, Enriched with Vitamin A&D, Both, None
Color	Dominant Brown, Moderate Brown, Minor Brown

Step 4: Design New Product Package

1. Develop product bundles

The full-profile approach was used in this step and a total of 48 profiles (product bundles) were needed. The number of product bundles was reduced using the orthogonal design method to 20 in order to reduce respondents' fatigue. The product bundles (Table 7) included 16 bundles used for estimation and 4 holdouts used to assess the reliability and validity of the model. Images to represent each product bundle were created using Adobe Photoshop® as shown in Appendix B.

Table 7. Product bundles for the conjoint analysis

No	Image Displayed	Text Displayed	Package Color
1	Cartoon	Fresh	Brown 100%
2	Both	Fresh	Brown 25%
3	Choc Bars	Both	Brown 100%
4	None	Vitamin Content	Brown 50%
5	Cartoon	Vitamin Content	Brown 25%
6	Cartoon	None	Brown 100%
7	Both	Both	Brown 100%
8	Both	None	Brown 50%
9	Choc Bars	None	Brown 25%
10	Choc Bars	Vitamin Content	Brown 100%
11	None	Both	Brown 25%
12	None	Fresh	Brown 100%
13	Choc Bars	Fresh	Brown 50%
14	Cartoon	Both	Brown 50%
15	None	None	Brown 100%
16	Both	Vitamin Content	Brown 100%
17[a]	Choc Bars	Fresh	Brown 100%
18[a]	Cartoon	Fresh	Brown 50%
19[a]	Cartoon	None	Brown 25%
20[a]	Both	Vitamin Content	Brown 25%

[a] holdouts

Product bundles' images were presented to ninety-seven participants (approximately 60% female and 40% male, 25 – 41 years old) in random order. Participants were asked to evaluate each product bundle by answering one question: "On a scale of 0 to 100, how likely are you to purchase this product?". Participants were informed that all products had the same brand, size, and price.

2. Determine design factors' relative importance

The part-worth utility scores and relative importance of attributes were estimated using the conjoint function in SPSS®. The validity of the model was assessed using Pearson's R and Kendall's tau which are considered acceptable measures for assessing attribute-based conjoint analysis data (Shan et. al, 2017; Jaeger et. al, 2013). Part-worth utilities of factor levels (i.e. the relative preference score computed for each factor level), and the relative importance of factors were estimated for each participant, and the mean values are summarized in Table 8. The high values observed for Pearson's R and Kendall's tau suggest that the conjoint analysis outcome fits the data well.

Table 8. Conjoint analysis results

Attribute	Attribute Level	Purchase Intention	
		Utility Estimate	Relative Importance
Image Displayed	Cartoon	4.239	63.440 %
	Chocolate Bars	-7.173	
	Both	31.050	
	None	-28.116	
Text	Fresh Milk	-5.253	24.260 %
	Vitamin Content	3.067	
	None	-10.028	
	Both	12.214	
Color	Dominant Brown	-4.823	12.300 %
	Moderate Brown	6.076	
	Low Brown	-1.252	
Constant		58.510	
Goodness of fit of conjoint analysis		Pearson's R = 0.988	
		Kendall's tau = 0.867	
		Kendall's tau for Holdouts = 1.000	
		(n = 93)	

The results show that the image displayed on the package had the highest importance, followed by the text, and lastly the color. This shows the importance that the designers need to give to these factors when designing a new flavored milk package. Additionally, the part-worth utility estimates for each attribute level can be used to assess the preference of new product designs as will be shown in the next section.

3. Finalize the new product package design

Three new package designs were proposed using the design factors as shown in Figure 5. The expected customer preference and the probability of purchase were simulated using the conjoint model using SPSS® and the results were as shown in Table 9. The results show that package A had the highest utility, followed by package B and package C. The simulation results were checked by conducting an experiment with only 20 participants. Each participant was shown images of the three designs and was asked: "On a scale of 100, how likely is it to purchase the product". The experiment results are listed in Table 9, which confirms the ability of the conjoint model to simulate customer preferences and the probability of purchase. This adds to the validity of the procedure used throughout this study.

This step shows how product package developers can simulate consumer preference towards new package designs allowing the developer to test new concepts before committing to any design.

		Package A	**Package B**	**Package C**
				
Design Factor	Image	Both	None	Cartoon
	Text	Both	None	Vitamin Content
	Color	Moderate Brown	Minor Brown	Dominant Brown

Figure 5. New package designs

Table 9. New package designs simulation and experimental results

	Experiment	**Simulation**			
			Preference Probabilities		
	Mean Preference	**Preference**	**Maximum Utility**	**Bradley-Terry-Luce**	**Logit**
Package A	95	107.851	100.0%	57.4%	100.0%
Package B	15	19.114	0.0%	10.1%	0.0%
Package C	70	60.992	0.0%	32.4%	0.0%

4. Conclusion

Asystematic approach to design packages for food products capable of attracting customers and increasing the willingness-to-buy was presented in this paper. The approach integrates several methods and techniques in a systematic fashion to facilitate the development process. The approach is composed of four major steps. The marketing messages that need to be communicated to customers are determined by a panel of experts in the first step. Next, the effectiveness of existing package designs and/or new packages concepts in delivering the marketing messages to customers are assessed by constructing perceptual maps in the second step. The perceptual map provides a graphical depiction of customers' perceptions of the messages delivered by each package design along with an analysis of the customers' preference towards the different packages assessed. The third step of the approach addresses the identification of the package design characteristics that embodied the marketing messages. These characteristics are treated as design factors that can be varied by package designers to develop new concepts. The design factors are used in step four to develop a new package design using conjoint analysis. Conjoint analysis is also used to predict the probability of purchasing new package designs.

The approach can be used by package designers to assess the effect of package design attributes on consumers' willingness-to-buy, thus allowing the designers to focus on major attributes that have a high impact on customer purchasing decisions. Additionally, the approach systemizes the process of identifying the actionable package design factors used to communicate the influential marketing messages. Also, the developed approach allows package designers to simulate the effect of varying package design attributes on customer willingness-to-buy and to propose new package designs with a high willingness-to-buy.

The study performed on the package design of flavored milk identified that the images displayed on the package had a greater effect in communicating marketing messages than color or text. The images within the context of flavored milk packages were able to deliver a message that the product is childish and had a rich flavor. While the text was found better at communicating health-related messages such as vitamin content. The color was used to deliver the message that the milk had a chocolate flavor.

Although this paper mainly addressed food product packages, the approach can be extended to design other product packages that need to communicate marketing messages to customers through its visual appearance.

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Appendix A: Existing Product Packages

Package 1

Package 2

Package 3

Package 4

Package 5

Package 6

Package 7

Package 8

Package 9

Package 10

Package 11

Package 12

Package 13

Package 14

Package 15

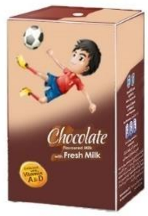
Package 16

Package 17

Package 18

Package 19

Appendix B: Product Package Design for Conjoint Analysis Study

Package 1	Package 2	Package 3	Package 4	Package 5
				
Package 6	Package 7	Package 8	Package 9	Package 10
				
Package 11	Package 12	Package 13	Package 14	Package 15
				
Package 16	Package 17	Package 18	Package 19	Package 20