An Application of Conjoint Analysis to Consumer Preference for Beverage Products in Nigeria

Emmanuel Olateju Oyatoye[1], Sulaimon Olanrewaju Adebiyi[2], Bilqis Bolanle Amole[3]

Abstract: Conjoint analysis is a technique for establishing the relative importance of different attributes in the provision of a good or a service. In this study, conjoint analysis was applied to characterize beverage product preferences for customers' information during buyer-seller purchasing decision interactions. It identify the influence certain consumers preferences have on beverage purchasing behavior. Using focus group discussion, major attributes were specified. The attributes were then used to generate a plan card using the orthogonal array method. A conjoint based survey using 29 ranked beverages attributes formed the basis of the questionnaires that were randomly administered to 200 purchasers' of beverages drinks between January and March 2013 to specify their preferences. Conjoint analysis was used and the result indicates that the preference range that would deliver the most utility for beverage consumers include products attributes such as reduced price (-0.478), cylindrical package (-5.822), moderately dissolving beverage granule (-1.833) and taste (-0.333). The findings conclude that producer need to take the issue of packaging serious in production by ensuring that their product is packaged in cylindrical container which will attract optimum attention of consumers thereby leading to profitability in the long run.

Keywords: beverage; conjoint analysis; customer value; product attributes; part-worth

JEL Classification: M31; L81; L66

1. Introduction

1.1. Background to the Study

The increased menu of products and services offered by manufacturing sectors and the increased competition has forced the market participants to evaluate how they can differentiate their products and services from those of competitors. If a producer can determine what is important and what is not important to a customer,

[1] Associate Professor of Operations Research, Department of Business Administration, University of Lagos, Nigeria. Address: University Rd, Lagos, Nigeria, Tel.: +2348052811824, e-mail: eoyatoye@unilag.edu.ng.
[2] Lecturer, Department of Economics and Financial Studies, Fountain University, Osogbo, Nigeria, Address: Oke-Osun, P.M.B. 4491, Osogbo, Osun State, Nigeria, Tel.: +2348033682722, Corresponding author: lanre18april@gmail.com.
[3] PhD Student, Department of Business Administration, University of Lagos, Nigeria, Address: University Rd, Lagos, Nigeria, Tel.: +2348034721305, e-mail: amolebb@yahoo.com.

he/ she has the potential to become more competitive by segmenting the market and providing the desired products and services to the segmented customers.

Verlegh and Steenkamp (1999) argued that consumers are constantly confronted with a wide variety of product information, supplied through packaging, branding, advertising and other channels. Although, the information is used by consumers to form preferences and purchase decisions, it also elicits emotions, feelings, imagery, and fantasies (Verlegh and Steenkamp).

The widespread consumption of beverages by consumers leads to exponential increase in variety of beverages made available in the market. To meet users'/ consumers' needs, innovative features and modifications are continuously being added to beverages to make them appeal to many consumers. Consequently, a beverage which is essentially transformed to liquid consumables has undergone numerous transformations, making its appearance to consumers more deceptive for purchase decisions. Understanding exactly what consumers require or desire from beverage poses a challenge for many producers. Little is known about the importance consumers place on the various attributes involved in the provision of beverages. The purpose of this study is to identify the attributes that consumers' desire in their purchasing decision of beverages using conjoint analysis, since one of the major purposes for the use of conjoint analysis is to measure consumer preferences among competing products and services.

Conjoint analysis is a multivariate technique which has been widely used in marketing research to understand how consumers develop preferences for different products or services (Bonilla, 2010). It allows estimating consumer's preferences of a product by combining part worth utilities for each attribute.

This analytical method is built on the assumption that consumers make complex decisions based not on one feature or attribute at a time, but on several features jointly. Thus, a properly executed conjoint study can be used to guide pricing tactics and strategies and provide data for measuring cross-price elasticity between beverage products, especially in an emerging market like Nigeria.

1.2. Statement of Problem

Beverage products are becoming number one on list of items an average student in Nigeria higher institutions ask for when leaving their home for school environment thus majority of beverage products manufacturers` target student. The purpose of this study is to develop a better understanding of consumer preferences for beverages attributes in Nigeria market. Specifically, to evaluate which types of packaging, taste, solubility, availability and price will be more convenient and attractive to the Nigeria student as market segment (who usually spends more of its

time away from home) in terms of the attributes influencing consumer's (student) intention to purchase as well as the factors that affect these preferences.

1.3. Objectives of the Study

The aim of this study to apply conjoint analysis to the consumer preferences for beverages products in Nigeria while the specific objectives are to:

- identify the attributes that consumers' desire in their purchasing decision of beverages;

- apply conjoint analysis to guide pricing tactics and strategies for beverage products;

- measure cross-price elasticity between products.

1.4. Research Questions

- what are the attributes that consumers desire in their purchasing decision of beverage product in Nigeria?;

- is conjoint analysis suite to guide pricing tactics and strategies for beverage products?;

- can conjoint analysis provide be used to measure cross-price elasticity between products?

1.5. Significance of the Study

Beverages has become one the major item on the list an average student going to school with in Nigeria and there is dearth of literature on conjoint analysis in the marketing field to identification of the preferences for extrinsic and intrinsic attributes for range of beverages products targeted at student in Nigeria University as specific market segments. The competition in the market is growing with attendant promotional activities and expenses which may not achieve the desired commensurate result if producer fails to determine what is and is not important to a customer (student). Therefore, there is need for this study to bridge the gap in literature.

2. Literature Review

Conjoint Analysis Applications

Green, Krieger and Wind (2001) reported that conjoint analysis evolved from the seminar research of Luce and Tukey (1964). Their theoretical contributions were put to use by a number of psychometricians, including Carroll (1969), Kruskal (1965), and Young (1969). These researchers developed a variety of nonmetric models for computing part-worths (attribute-level values) from respondents' preference orderings across multiattributed stimuli, such as descriptions of products or services. Conjoint analysis is, by far, the most used marketing research method for analyzing consumer trade-offs. Surveys conducted by Wittink and Cattin (1989) and Wittink, Vriens, and Burhenne (1994) attest to its world-wide popularity.

Green *et al*, further opines that it is not difficult to see why researchers developed and applied conjoint analysis so rapidly because conjoint analysis deals with a central management question: Why consumers choose one brand or one supplier over another? Also, marketing research practitioners want to be part of something new, and computer software for implementing the methodology became readily available.

Hair, Anderson, Tatham and Black (1995) as cited in (Schaupp and Bélanger, 2005) revealed that conjoint analysis is a research technique used to estimate or determine how respondents develop preferences for products or services, and to measure the trade-offs people make when making a decision.

Conjoint analysis is based on the premise that subjects evaluate the value or utility of a product/ service/ idea (real or hypothetical) by combining the separate amounts of utility provided by each attribute, in this study beverage attributes values. Conjoint analysis is a de-compositional technique, because a subject's overall evaluation (preference) is decomposed to give utilities for each predictor variable, and for each level of a predictor variable. Conjoint analysis is commonly found in behavioral studies (Green & Srinivasan, 1978) and in marketing studies (Green & Rao, 1971) where the predictor variables are called attributes, and the dependent variable is often an overall evaluation of a product. A conjoint analysis study has two primary objectives. The first is to determine the contributions of various predictor variables and their respective values (or levels) to the dependent variable (usually overall evaluation). The second objective is to establish a predictive model for new combinations of values taken from the predictor variables (Bajaj, 1998).

In a conjoint experiment the researcher constructs a set of hypothetical products by combining selected levels of each attribute, these combinations result in the design of the stimuli which is presented to the respondents. Consumers will provide their

evaluations on the basis of the behavior of interest, known as the choice task (Cardello, Schutz, and Lesher, 2007).

Approximately sixty percent of all conjoint studies are related to consumer goods (Cattin and Wittink, 1982). Applications of conjoint analysis are used primarily for new product or concept evaluation, pricing decisions, market segmentation, advertising, and distribution. Thus this study falls in the categories of beverage product evaluation and market segmentation.

Other studies that used conjoint analysis to examine buyer or user preferences for new food products or technology includes Harrison, Stringer and Prinyawiwatkul (2002), conjoint analysis to analyze preferences for three consumer-ready products derived from catfish. Again, in (2004) Harrison and Mclennon used conjoint analysis to measure the preferences of U.S. consumers for labeling of biotech food. Deliza, MacFie, Feria-Morales, and Hedderley., (2000) applied conjoint analysis to study the effect of consumer expectations on the evaluation of instant coffee, and in (Deliza, MacFie, and Hedderley., 2003) used it to investigate consumer expectations using computer generated images of packages of an unfamiliar fruit juice (passion fruit). Sethuraman, Kerin, and Cron, 2005) worked with conjoint analysis to identify which product attributes consumers prefer for a new generation of wireless telephone handsets.

There are three steps involved in a conjoint study. The first step involves defining the product attributes and their levels. Typically, a conjoint study involves six or seven attributes. Once the attributes and levels are identified, it is necessary to define a set of hypothetical products that can be presented in different forms such as descriptive form, pictorial form or a prototype (Vriens, Looschilder, Rosbergen, and Wittink, 1998). Second, an experimental design and a choice of data collection method should be constructed; followed by the selection of measuring scale for the dependent variable and the estimation method for analysis of the data. Participants then are asked to evaluate their overall preference for the hypothetical product. The last step involves selecting the empirical model and estimating the buyer's part-worth utilities (Harrison, Ozayan, and Meyers, 1998).

Conjoint analysis is a technique for measuring trade-offs for analyzing survey responses concerning preferences and intentions to buy, and it is a method for simulating how consumers might react to changes in current products or to new products introduced into an existing competitive array. Researchers have used conjoint analysis for consumer and industrial products and services and for not-for-profit offerings (Green, Krieger and Wind, 2001).

In conjoint analysis, a product can be described as a combination of a set of attribute levels, where a utility value is estimated for each attribute level that quantifies the value that an individual places on each attribute level. The utility values, contributed by each attribute level, then determine purchasers' total utility

or overall judgment of a product (Green & Srinivasan, 1978). The product attributes and associated attribute levels used in this research were derived from a preliminary interview granted some seller and buyers of beverages product in the study area (see Table 1).

Table 1. Product Attributes and Associated Product Attribute Levels

Product attributes	Product attribute level
Design package	Pyramid Cylindrical Indented Cuboid' Sachet
Taste	Sugary Milk like Choco like
Solubility (dissolution)	Instant Moderate Slow
Availability	Readily Moderate Not readily
Price	40 naira 170 naira 640 naira

Source: Field Survey, 2013

The full-profile conjoint analysis approach was chosen for this study as it presented purchasers with realistic descriptions of alternative hypothetical beverage concepts (Green & Srinivasan, 1978). The orthogonal design procedure in SPSS, which used a fractional factorial design, made it possible to gather information on a large number of beverage concepts although purchasers only rated a limited number of beverage concepts (see Sorenson & Bogue, 2006). Importantly, the fractional factorial design maintained the effectiveness of evaluating the relative importance of a beverage's multi-dimensional attributes (American Marketing Association, 1992).

2.2. The Concept of Creating Value to the Customer

For understanding customer needs and studying them systematically it is necessary to be familiar with the concept of creating value to the customer. Walters and Lancaster (1999) have stated that value is created by any product or service attribute, which motivates the customer to buy the product and takes him closer to

achieving his goals. According to Woodall, (2003), attributes of a product or service that create value to customers can be divided into:

- factors that enhance customer's benefits or help to satisfy his needs;
- factors that decrease customer's costs.

Cost can be defined in the broadest sense as everything the customer has to give up in order acquiring the benefits offered by the supplier. Costs can be monetary as well as non-monetary (time spent, aggravation, risk). Benefits can be affected by a variety of factors (Woodall). Ferrell, Hartline, Lucas and Luck (1998) points out the following main factors as benefits: product quality, customer service quality and experience based quality (table 2). Band's (1991) approach is essentially the same, but he also includes customer service personnel compliance to customer expectations because it is often found that customers can easily perceive the difference between the adequacy of company's processes and the behavior of service personnel (Rosen & Supernant, 1998). Additionally, it is also often pointed out that brand can create value to customers (Best, 2000); and of course there are usually industry specific factors that customers perceive as valuable.

Table 2. Distinguishing the Sources of Benefits to Customers

Source of the Benefit	Example
Product quality	Functionality, reliability, additional features, customization based on customer needs, aesthetics, warranty, ease of use.
Quality of customer service processes	After sales support, delivery time, reliability of delivery, information about product, responsiveness in case of emergency, product return and compensation policy.
Quality of customer service personnel	Communication, quality of responses to requests, friendliness, professionalism, looks, helpfulness when solving problems.
Brand image	Main perception dimensions: sincerity, excitement, competency, maturity, vitality.
Emotions based Quality	Atmosphere of the sales place, PR, promotion events, emotions generated during service: trust, pleasure.

Source: Adapted from Ferrell et al., 1998; Band, 1991; Best, 2000; Walters, Lancaster, 1999; Woodall, 2003.

Although, a preference in selecting services or products has been widely used, many models have been in placed so far to analyse preferences. The preference models were widely used in new product design, marketing management, and market segmentation (Green and Srinivasan 1990; Wittink and Cattin). A decision is made after analysing preferences via numerous techniques. Decision is becoming more complex when preferences are based on multi-attributes products or services. One of the well-known analyses, especially in marketing and businesses that is believed to be able in helping decision makers was conjoint analysis. Conjoint

analysis was originally developed to study individuals' preferred levels and relative importance of the multiple attributes of market goods (Louviere, 1988). This technique coined by Green and Srinivasan (1978) is based on the assumption that individuals can evaluate multi-attributes in such a way that their responses are approximately intervals in a measurement level. Because the customer requirements elicited from one customer group may have considerable conflicts with another, a comprehensive evaluation of multicultural factors among diverse customer needs is crucial. The multivariate technique is used specifically to understand how respondents develop preferences for products or services. It is based on the simple premise that consumers evaluate the value of a service or product by combining the separate amounts of value provided by each attributes (Stamatis, 2003).

Recent research has used stated preference techniques such as stated choice and conjoint analysis to develop quantitative estimates of the relative importance on selected attributes of the services or products. Strength of stated choice and conjoint analysis methods is concentrated upon weights. Respondents are asked to express their preferences and provide importance weightings for a single attribute. At the same time, respondents are asked to rank, rate or choose among profiles that describe alternative configurations of the set of attributes under consideration. In recent years, conjoint analysis has been extended to study public attitudes and preferences concerning the provision and management of public goods (Dennis, 1998; Kneeshaw, Vaske, Bright, & Absher, 2004; Stevens, Belkner, Dennis, Kittredge & Willis, 2000).

2.3. Customer Preferences

In today's rapidly changing market, demand for a product which determines an enterprise strategy is often influenced by customer preferences (Fornell, 1992). Since products and services are closely related to their providers, the product preference can be regarded as the enterprise preference, that is, when a customer decides to consume a given product or service, he/she actually has preferred the producer or provider of that specific product or service. So, customer preference for a product can be defined along with the concept of brand preference. Brand preference is the extent to which the customer favours the designated service provided by his or her present company, in comparison to the designated service provided by other companies in his or her consideration set (Hellier, Geursen, Carr & Rickard, 2003). As Cao and Ramani (2010) stated, a customer's preferences for a product can be viewed as a reflection of his or her inner world. Therefore, it is the customers' attitudes and perceptions toward a product or company which determine their preference. Customers' demands and preferences of different products and services are the subject of concern for many business areas. However,

there is dearth of literature on the empirical evidence from emerging market like Nigeria and most especially on beverages products.

3. Methodology

This study was carried out in Osun State located in south-western Nigeria, and lies within latitude 7.0^0 and 9.0^0 N and longitude 2.8^0 and 6.8^0 E. Two hundred student of Obafemi Awolowo University (OAU) Ile-ife, were randomly sampled as beverage consumers that filled the questionnaires. The choice of Osun state was predicated on the fact that most student of OAU are from outside the town (i. e their parent are not resident of Ile Ife). The sample size of 200 respondents is justified for this conjoint study based on the report of Cattin and Wittin, 1982, that sample size in commercial conjoint study usually ranges 100 to 1000 respondents. This was also supported by the position of Akaah and Korgaonkar (988) which states that sample size less 100 respondents is not sufficient for conjoint study. Thus, 200 respondents that filled these questionnaires were enough for reliable study.

In the course of this study, a preliminary survey was carried out using focused group discussion. Beverage consumers were interviewed at various beverage markets in order to determine some of the attributes consumers look for when selecting their product of choice. Five major attributes were specified which are packaging, taste, solubility, availability and price. As a general rule, the maximum number of attributes allowed in a traditional conjoint analysis is nine (Hair, Anderson, Tatham and Black, 1998). Green and Srinivasan (1990) reported that survey respondents may have difficulty assessing more than six characteristics, and also warned against "information overload".

With five attributes (packaging, taste, solubility, availability and price) associated with (5 x 3 x 3 x 3 x 3) levels respectively, there were 405 possible product combinations. Because the complexity associated with a larger number of choice sets in the design could affect respondent decisions, we minimized the number of choices using an orthogonal fractional factorial design. The IBM SPSS software was used to formulate 25 orthogonal attribute combinations, and 4 holdout additional combinations for validation.

The attributes were then used to generate a plan card using the orthogonal array method (Table 3) with the aid of statistical package for social sciences. These plan cards consist of different combination of the earlier specified attributes and this attributes were combined in 29 different ways including holdouts. These 29 cards formed the basis of the questionnaires that were administered to the respondents to rank their preferences. The questionnaires were administered to 200 respondents selected randomly from a list of beverage consumers in the study area. Since

conjoint analysis (CA) is based on the notion that consumers value products based on the utility provided by its attributes, information provided by the respondents were then analysed.

Table 3. Orthogonal Array Combination of Attributes of Beverage Product

	Card ID	design package	taste	Dissolution	availability	price
1	1	Cylindrical	Choco like	Instant	moderate	40
2	2	Cuboid	Choco like	Instant	Readily	640
3	3	Cuboid	Sugary	Slow	moderate	170
4	4	Indented	Choco like	Moderate	moderate	40
5	5	Sachet	Choco like	Slow	Readily	170
6	6	Cuboid	Sugary	Moderate	Readily	40
7	7	Indented	Milklike	Moderate	Readily	640
8	8	Sachet	Sugary	Moderate	Readily	40
9	9	Pyramid	Sugary	Instant	Readily	40
10	10	Indented	Choco like	Slow	not readily	40
11	11	Pyramid	Milklike	Instant	moderate	40
12	12	Sachet	Milklike	Moderate	moderate	170
13	13	Sachet	Sugary	Instant	not readily	40
14	14	Cuboid	Milklike	Instant	not readily	170
15	15	Pyramid	Sugary	Slow	moderate	640
16	16	Indented	Sugary	Instant	Readily	170
17	17	Sachet	Choco like	Instant	moderate	640
18	18	Pyramid	Choco like	Moderate	Readily	170
19	19	Cylindrical	Sugary	Moderate	moderate	170
20	20	Indented	Sugary	Instant	moderate	170
21	21	Cylindrical	Choco like	Instant	Readily	170
22	22	Cuboid	Choco like	Moderate	moderate	40
23	23	Pyramid	Choco like	Moderate	not readily	170
24	24	Cylindrical	Sugary	Moderate	not readily	640
25	25	Cylindrical	Milklike	Slow	Readily	40
26[a]	26	Cylindrical	Choco like	Slow	Readily	170
27[a]	27	Pyramid	Milklike	Instant	Readily	40
28[a]	28	Pyramid	Milklike	Slow	not readily	170
29[a]	29	Indented	Milk like	Instant	not readily	40

a. Holdout

The questionnaires were analyzed using IBM SPSS v20. The individual-level conjoint analysis procedure in SPSS calculated coefficients, expressed as utility values, which linked the attribute levels to changes in product ratings.

4. Results and Discussion

Table 4. Part-worth or Utility Estimate of Beverage Products Attributes

Attributes	Level	Utility estimate	Utility range	Importance (%)
Packaging	Pyramid	1.244	8.622	
	Cylindrical	-5.822*		40.299
	Indented	2.800		
	Cuboid	1.778		
	Sachet	2.220E-16		
Taste	Sugary	.533	0.866	10.751
	Choco-like	-.200		
	Milk-like	-.333*		
Solubility	Instant	.778	2.889	17.366
	Moderate	-1.833*		
	Slow	1.056		
Availability	Readily	.700	2.378	18.412
	Moderate	1.189		
	Not readily	-1.889*		
Price	40	-.478*	1.034	13.172
	170	-.078		
	640	.556		
Total			15.789	100.00

*Source: Data Analysis, 2013 *represents the most preferred level in the Attributes*

The result of conjoint analysis in Table 4 shows that the most important attribute to the consumers is packaging which contribute 8.622 to the consumers' total utility of 15.789 while the consumers most preferred category of packaging is cylindrical. This finding suggests the relative importance of packaging to consumers. Also, next in importance to the consumer is the solubility of the product, which contribute 2.889 to the consumers' total utility of 15.789 .The utility estimates indicate that the consumers have preference for moderately dissolving drink (-1.833) over instant (0.778) or slow dissolving ones (1.056). Contrary to a priori expectation, taste was the least important attribute (utility range = 0.866) considered by the consumers in making their choices; this could be as a result of majority of players in the beverage industry having reached a level in which the taste of their product becomes generally satisfactory to the consumers. Price also proved to be important (1.034), more than taste (0.866) and less than availability (2.375). Overall, the result indicates that the preference range that would deliver the most utility for beverage consumers would include products attributes such as

reduced price (-0.478), cylindrical package (-5.822), moderately dissolving beverage granule (-1.833) and taste (-0.333). Producers that deliver beverage within the stated preference range would have successfully delivered utility of 13.411 out of 15.789.

Furthermore, the derived utility values were then used to determine the importance of each attribute. Pearson's, R, and Kendall's, tau, association values were used to assess the validity of the conjoint analysis model. The Pearson's R (0.759) and Kendall's tau (0.544) values were high and indicated strong agreement between the averaged product ratings and the predicted utilities from the conjoint analysis model. This is validated by the position of the Green and Srinivasan (1990) that values close to one indicate strong agreement between the average product ratings and the predicted utilities from the conjoint model (see table 5).

Table 5. Correlations between Observed and Estimated Preferences

Correlation	Value	Sig.
Pearson's R	0.759	0.000
Kendall's tau	0.544	0.000

5. Summary and Conclusion

This paper demonstrated the application of conjoint analysis in assessing the beverage attributes that are important to consumers of beverages product in Nigeria. Findings from conjoint analysis provide information that may not readily be obtained from sampled respondents on their attribute preferences. The findings of this study show that combined attributes of price, packaging, solubility and taste are crucial in consumers' preference decision on beverage purchase and consumption. Producers need to take the issue of packaging serious in production, ensuring that their product is packaged in cylindrical container as the study reveals.

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