

# Preference of Health Drinks among Children in the Context of West Bengal: A Conjoint Analysis

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## Abstract

There is a substantial role of nutrition in health maintenance among children. A balanced diet is essential for a good health. This balanced diet comprises of adequate amount of health drinks which play a vital role in their growing period thereby achieving an optimal health for them. Thus this age group has developed a preference towards different health drinks according to its flavor, packaging, gifts, colour and social influence. The study aims to highlight which suitable combination attracts children towards choosing their health drinks and why. Different health drinks cater some specific demand of the kids. Each of them has their own unique features. But the survey conducted revealed that particularly one specific feature of each health drinks attracts children and a combination of so will enhance their purchasing decision. A conjoint analysis was done to get the optimal combination in which we found that dark chocolate colour health drinks with chocolate flavor that gives free school items which has some story imprinted on their packet attracts the children more and their prime source of influence is television.

**Keywords:** health drinks, children, flavor, colour, social influence

## 1. Introduction

It has become essential and an absolute must to acquire and maintain nutrition adequacy among children in line with the changed social and environmental needs for the well being of our future generation. Children do require healthy and satisfactory nutrition especially during their periods of rapid growth and development. The maximum potential of a child's genetic legacy can be brought about in the way of a balanced diet which brings about a healthy living for them. In fact the way in which they eat has a significant influence on how they would prevent development of diseases in future. Proper nutritious elements are required in children to eliminate the existence of concrete possibility of the child developing disorders. Therefore health drinks form an important and inseparable part of a diet for children. Health drinks which is also making milk richer, has become an intense affair in every household. A power packed drink with required amount of vitamins, energy value, carbohydrates, calcium, iron, fats, proteins, folic acid, phosphorous, potassium and niacin is required for the body for maintaining a healthy immune system; thereby the main driving force behind its changing consumption patterns. Specially mothers' have an emotional attachment when it comes to the nutrition of their children. Moreover kids have a special preference in selecting their health dinks which not only act as a milk additive but its delicious taste boosts their rate of preference towards it (Ali & Mohamed, 2015).

## Related Review of Literature

Malted health drinks has been adopted by consumers and rated as one of the best health drinks which can replace a complete food and has captured a large market share (Dave & Paliwal, 2016). Children have a preference towards chocolate flavoured milks as it contains 12% milk solids with different cocoa powder (Hampton, et al, 1969). There is a preference of dark chocolate flavour and they have a perception that it is healthier which is quite justified as it has a greater percentage of cocoa powder (Gambaro & Ellis, 2012). Results have been revealed in a 'sensory acceptability of

chocolate fills' that people prefer strawberry truffles (Miquelim et al. 2008). Surveys have found that there has been a strong acceptability of dark chocolates and has a better sensory property (Torres, et al, 2011). The dark brown shining colour of health drinks are mostly preferred by consumers (Tamilselvi & Kirubakaran, 2010). Packaging and information on health drinks plays an important role in consumer perception of healthiness and its purchase. It positively impacts consumer responses (Riley D. et al, 2015). Children have become exposed to television to a great extent and the advertisements easily target this group. Thus television has an immense influence on kids. It has been identified that children are exposed to 40000 television ads relating to soft drinks, health drinks, cereals and chocolates. These items therefore become much popular among them and always are in spotlight. Children accordingly develop a special preference towards them through their influence (Hibbs, 2008). Family, particularly parents play a leading role in adjusting the eating habits of their children. Children face the first and foremost social influence from their parents. Thus parents and family as a whole has a concern and influence children towards their choice of beverages, health drinks, dietary sucrose and other consumption pattern (Jaime, P.C. et al, 2017). Influence of social group, distinctly, school friends has an extensive sway on children towards their purchasing behaviour of food items. A school friend reinforces their purchasing tendency and becomes important to them while making purchase decisions (Neto & Melo, 2013). For companies to whom children are the consumers, they involve in television spots that highlight toys and other free gift items as a promotional strategy that steals their attention and it has an effect on them while choosing to buy the chief product (Calvert, S, 2008). Packaging of products influences children's perception. Product image, style, visual elements, has a strong effect on children towards choosing of any food item (Letona, P., 2014). The role of packaging on consumer purchasing behaviour is immense. It forms an important part of communication. Packaging colour, design, material, background image stimulate their buying behaviour especially in point of sale (Deliya & Parmar, 2012).

**Objective:**

1. To determine the relative importance of the health drink attributes, preferable among children in the context of West Bengal.
2. To determine the relative importance of different levels of each attributes, preferable among children in the context of West Bengal.

**Research Methodology:**

300 guardians of targeted children were chosen for getting different profiles to determine what combination of attributes with various levels would be most preferable health drinks among children in the context of West Bengal. These primary data were collected on 5 different attributes (Colour, Packing design, Flavour, Gifts, Influence), each of them having 3 levels. Out of 300 respondents, 287 were error free feedback which was used in conjoint analysis. The survey period of this study was 15<sup>th</sup> December, 2017 to 10<sup>th</sup> February, 2018. In this study, full profile approach technique has been used. Each profile is depicted on a respondent's sheet (Annexure-1) and they are asked to evaluate as per their preference level towards individual attributes on a 9-point interval scale (1= least preferred and 9= most preferred). In this study Simple random Sampling was used as the Sampling Technique.

**Table 1: Categorization of Children:**

	Children Preference on Different Category		
	Only Milk	Health Drinks with Milk	Only Health Drinks
No. of Children	43	209	35

\*Feedback collected from 287 guardians

**Table 2: Attributes and Levels of Health Drinks**

Attributes	Number	Level Description
Colour	3	Milky white
	2	Caramel Brown
	1	Dark Chocolate
Packaging Design	3	Polychromatic design
	2	Giving cartoon shape to packets
	1	Story & information
Flavour	3	Chocolate
	2	Vanilla
	1	Strawberry
Gifts	3	Toys
	2	School items
	1	Games
Influence	3	School friends
	2	Television
	1	Parents

By the help of dummy variable regression, conjoint analysis has been executed where dependent variable (**Y: Preference**) is treated as utility of the level of attributes. The utility model can be written as follows.

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + e$$

Where,  $X_1$  &  $X_2$  = dummy variables for 'Colour'  
 $X_3$  &  $X_4$  = dummy variables for 'Packaging Design'  
 $X_5$  &  $X_6$  = dummy variables for 'Flavour'  
 $X_7$  &  $X_8$  = dummy variables for 'Gifts'  
 $X_9$  &  $X_{10}$  = dummy variables for 'Influence'

**Table 3: Regression Model Fit**

ANOVA <sup>b</sup>						
Model		Sum Squares	df	Mean Square	F	Sig.
1	Regression	543.118	10	54.312	<b>218.482</b>	<b>.000<sup>a</sup></b>
	Residual	68.610	276	.249		
	Total	611.728	286			

a. Predictors: (Constant), X10, X5, X4, X7, X2, X3, X6, X9, X8, X1

b. Dependent Variable: Preference\_Rating

**Table 4: Regression Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	t-Value	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.978	.059		84.743	.000*
	X1	-.247	.038	-.070	-6.540	.000*
	X2	-.210	.049	-.045	-4.285	.000*
	X3	-1.047	.026	-.339	-39.703	.000*
	X4	-.063	.028	-.020	-2.264	.024**
	X5	1.623	.027	.524	61.146	.000*
	X6	1.799	.027	.582	67.426	.000*
	X7	-.233	.029	-.076	-7.955	.000*
	X8	.551	.029	.178	18.734	.000*
	X9	.172	.030	.055	5.643	.000*
	X10	2.409	.030	.778	81.175	.000*

Dependent Variable: Preference Rating

\* & \*\* represent 1% & 5% level of significance

Here estimated regression model is fit with F-Value of 218.482 and significant value less than 0.01 (Table 1). The estimated regression equation is as follows.

$$U \text{ (Utility)} = 4.978 - 0.247 * X_1 - 0.21 * X_2 - 1.047 * X_3 - 0.063 * X_4 + 1.623 * X_5 + 1.799 * X_6 - 0.233 * X_7 + 0.551 * X_8 + 0.172 * X_9 + 2.409 * X_{10}$$

Here,

$b_0 = 4.978$	$b_1 = -0.247$	$b_2 = -0.21$	$b_3 = -1.047$
$b_4 = -0.063$	$b_5 = +1.623$	$b_6 = +1.799$	$b_7 = -0.233$
$b_8 = +0.551$	$b_9 = +0.172$	$b_{10} = +2.409$	

Each dummy variable coefficient represents the difference in the utility for that level minus the utility for the base level.

<p>*For <b>Colour</b>, we have the following equations,  <math>\alpha_{11} - \alpha_{13} = -0.247</math>;  <math>\alpha_{12} - \alpha_{13} = -0.21</math>;            With Constraint equation, <math>\alpha_{11} + \alpha_{12} + \alpha_{13} = 0</math>            Therefore  <math>\alpha_{11} = -0.095</math>  <math>\alpha_{12} = -0.058</math>  <math>\alpha_{13} = 0.152</math></p>	<p>*For <b>Packaging Design</b>, we have the following equations,  <math>\alpha_{21} - \alpha_{23} = -1.047</math>;  <math>\alpha_{22} - \alpha_{23} = -0.063</math>;            With Constraint equation, <math>\alpha_{21} + \alpha_{22} + \alpha_{23} = 0</math>            Therefore  <math>\alpha_{21} = -0.677</math>  <math>\alpha_{22} = 0.307</math>  <math>\alpha_{23} = 0.370</math></p>
<p>*For <b>Flavour</b>, we have the following equations,  <math>\alpha_{31} - \alpha_{33} = +1.623</math>;  <math>\alpha_{32} - \alpha_{33} = +1.799</math>;            With Constraint equation, <math>\alpha_{31} + \alpha_{32} + \alpha_{33} = 0</math>            Therefore  <math>\alpha_{31} = 0.482</math>  <math>\alpha_{32} = 0.658</math>  <math>\alpha_{33} = -1.141</math></p>	<p>*For <b>Gifts</b>, we have the following equations,  <math>\alpha_{41} - \alpha_{43} = -0.233</math>;  <math>\alpha_{42} - \alpha_{43} = +0.551</math>;            With Constraint equation, <math>\alpha_{41} + \alpha_{42} + \alpha_{43} = 0</math>            Therefore  <math>\alpha_{41} = -0.339</math>  <math>\alpha_{42} = 0.445</math>  <math>\alpha_{43} = -0.106</math></p>
<p>*For <b>Influence</b>, we have the following equations,</p>	

$\alpha_{51} - \alpha_{53} = 0.172$ ; $\alpha_{52} - \alpha_{53} = 2.409$ ; With Constraint equation, $\alpha_{51} + \alpha_{52} + \alpha_{53} = 0$ Therefore $\alpha_{51} = -0.688$ $\alpha_{52} = 1.549$ $\alpha_{53} = -0.860$	
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The relative importance weights are calculated based on the ranges of utilities as follows:

Sum of the ranges of utilities =  $[0.152 - (-0.095)] + [0.370 - (-0.677)] + [0.658 - (-1.141)] + [0.445 - (-0.339)] + [1.549 - (-0.860)] = 6.286$

Therefore,

Relative importance of 'Colour' =  $[0.152 - (-0.095)] / 6.286 = 0.04$

Relative importance of 'Packaging Design' =  $[0.370 - (-0.677)] / 6.286 = 0.17$

Relative importance of 'Flavour' =  $[0.658 - (-1.141)] / 6.286 = 0.29$

Relative importance of 'Gifts' =  $[0.445 - (-0.339)] / 6.286 = 0.12$

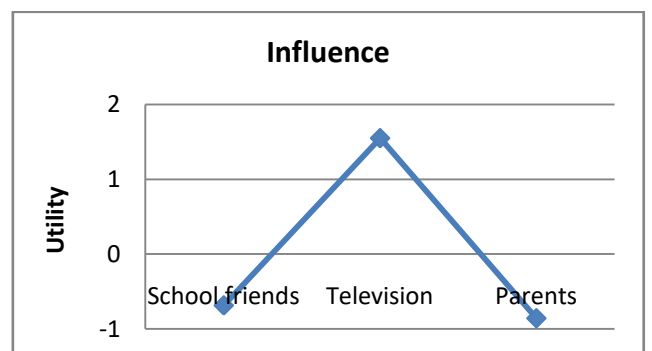
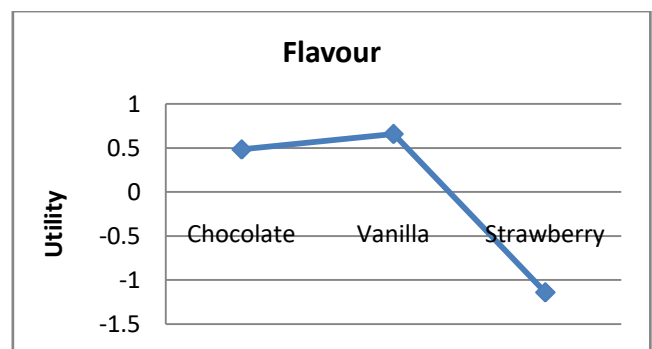
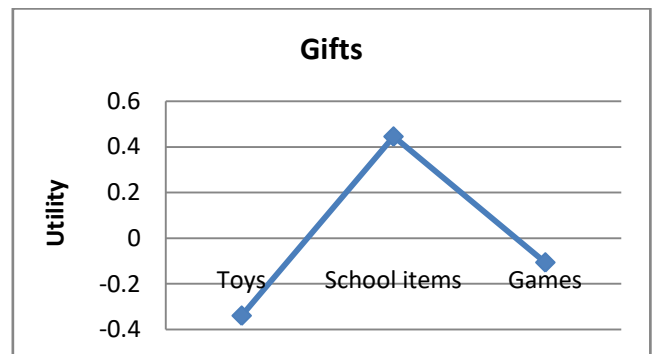
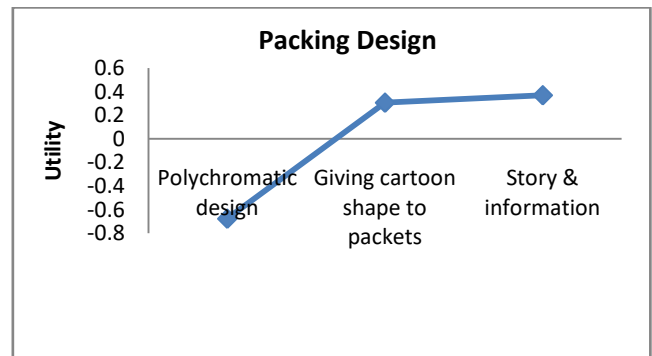
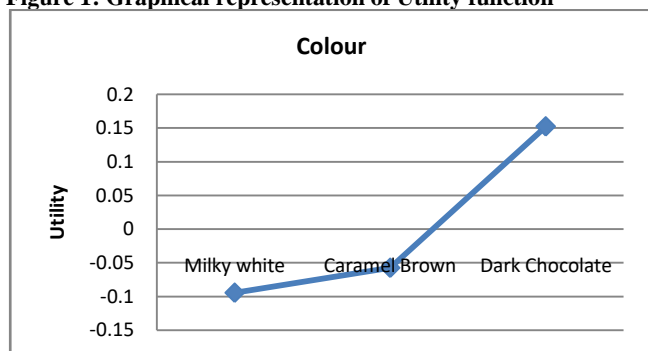
Relative importance of 'Influence' =  $[1.549 - (-0.860)] / 6.286 = 0.38$

The results for utilities and relative contribution of attributes are depicted in the following table:

**Table 5: Results of Conjoint Analysis**

Attributes	Number	Level Description	Utility	Importance
Colour	3	Milky white	-0.095	0.04
	2	Caramel Brown	-0.058	
	1	Dark Chocolate	0.152	
Packaging Design	3	Polychromatic design	-0.677	0.17
	2	Giving cartoon shape to packets	0.307	
	1	Story & information	0.370	
Flavour	3	Chocolate	0.482	0.29
	2	Vanilla	0.658	
	1	Strawberry	-1.141	
Gifts	3	Toys	-0.339	0.12
	2	School items	0.445	
	1	Games	-0.106	
Influence	3	School friends	-0.688	0.38
	2	Television	1.549	
	1	Parents	-0.860	

**Figure 1: Graphical representation of Utility function**



## Conclusion

This study shows that the percentage of children who consume health drink frequently is increasing significantly than the children who only consume milk. Many studies on gaining nutrition values and calories of the children have shown that children are poor at compensating those required elements when children consume only milk. A desire from guardian side is automatically evolved to provide a health drink where children can get total energy intake. Therefore health drink companies need to focus preference level of children on different attribute of health drinks and their perfect combination where children can be easily attracted. In this research study, estimation of utilities and relative importance of different weights help to interpret the result clearly. Here, the weight assigned by the respondents to colour, packing design,

flavour, gifts, influence are 4%, 17%, 29%, 12% and 38% respectively. It has been observed that respondents prefer vanilla flavoured, story & information packing design, school items gifts, dark chocolate colour followed by the influence of television.

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## Annexure-1

Profile No.	Colour	Packaging Design	Flavour	Gifts	Influence	Preference Rating
1	3	1	3	2	1	4
2	3	2	1	2	1	8
3	3	3	2	2	1	7
4	1	1	1	2	3	6
5	1	2	2	2	3	7
6	1	3	3	2	3	5
7	2	1	2	3	2	9
8	2	2	3	3	2	7
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186	2	2	1	3	1	6
187	1	3	2	3	2	7