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## **Evaluation of the attractiveness of different packaging designs for child food products by Beninese customers**

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### **Introduction**

Child malnutrition is a major problem in Benin, where 31 % of children under five years suffer from stunting and 5 % from wasting (UNICEF/WHO/World Bank 2020). The resulting irreversible negative health effects and intensified poverty of individuals reduce the development opportunities of entire countries (Adebisi et al. 2019; Bagriansky et al. 2014). Affordable, tasty and nutritious child food produced by local women entrepreneurs could help mitigate the problem. However, minimising spoilage and entering the formal market requires appropriate, attractive and informative packaging.

The increasing importance of packaging from a marketing perspective, especially in self-service establishments, was emphasised by various authors (Gómez et al. 2015; Peters-Teixeira and Badrie 2005). Culture influences communication and the communicative features of packaging thus have to be adapted to local levels and cultures (Foscht et al. 2008; van den Berg-Weitzel and van de Laar 2001).

Since data on the influence of packaging design on perception and choices of child food from Benin is rare, the present study aims to reveal Beninese parents' packaging preferences by conducting a traditional conjoint analysis (TCA).

### **Material and Methods**

In collaboration with local women groups, porridge was chosen as the product to be tested in the present study since it is regularly consumed by Beninese children. Photos of porridge packagings were analysed to identify stimuli for a TCA. A pre-study was conducted in Parakou, Benin, to determine the study's stimuli, i.e., the specification of the design elements (attributes) and their characteristics (attribute levels) (Cramer et al. 2021). Design elements with a special meaning to Beninese consumers were chosen with the objective of comparing their relevance with those derived from the pre-study. They were derived from wax-print fabrics: objects of desire, symbolising importance, relevance and prestige in Benin (Young 2016; Sylvanus 2007). A blackboard from a famous classic design called 'Alphabet', symbolising 'good value' (Abrams 2018; Vlisco 2020) was chosen as an attribute level as was a red colour, copied from the same design, which is made up of small bubbles, blending into each other.

For the conjoint study, 15 stimuli (D-efficient design) were derived from this groundwork (for attributes and attribute levels, c.f. Table 1). Based on these stimuli, 15 different images of child food packaging were created, each showing a brown paper bag with a white sticker. On the white sticker, the elements for the conjoint study as well as images of the porridge's ingredients were

shown (Figure 1). The porridge ingredients were the same on each packaging design and thus are not included in the conjoint study.



Figure 1: Examples of images of child food packaging used in conjoint analysis

The TCA was embedded in an online questionnaire and the link to the survey was shared with child food consumers from Parakou and the surrounding areas in northern Benin. The survey gathered information about the socio-demographic profile of respondents and their food purchasing behaviour. During the TCA, the 15 packaging images were shown in a randomised order to respondents who rated them in terms of the perceived attractiveness of the packaging designs on a scale of 1-10 with 10 representing the highest level of affirmation. Lime Survey was used to conduct the online survey and TCA; statistical analyses were conducted using Stata Version 16.1 and Excel.

## Results and Discussion

110 consumers completed the study in January 2022. The average age of participants was 28.59 years ( $\pm$  SD 5.5 years), 91% were females, 1% males and 8% provided no answer. 98 % of participants stated that they were currently taking care of children, 1% said that they are in the near future planning to take care of children and 1% did not answer. 78% of participants were from towns and 21% from rural areas, 1% did not answer. 47% lived in cement houses, 46% in loam houses, 2% in mobile homes and 5% did not provide an answer.

Nearly half of respondents stated that they never or very seldom buy child food and nearly two thirds answered that they never or very seldom buy packaged child food (Figure 2). These findings are in line with Bosu's (2015) research and his conclusion that most West African countries, including Benin, are still at an early stage of the nutrition transition and foods consumed are predominantly traditional.

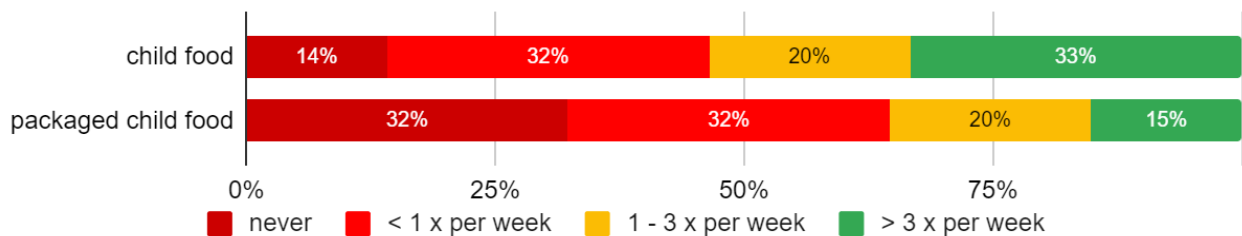


Figure 2: Responses re frequency of food purchases

The rating of packaging designs ranged from 5.68 (SD 2.15) for the lowest rated to 7.49 (SD 1.68) for the highest rated design. The design's influence on the evaluation of attractiveness was significant, as shown by the regression model ( $R^2 = 0,12$ ,  $p < 0.001$ ).

Determining the relative importance of design elements, the background element had the highest relative importance (35%), followed by the pictorial representation of a woman’s silhouette (21%) and colour (21%). Of less relative importance were the pictorial representation of a giraffe (15%) and the nutritional information (9%). Of the background element levels, the display of the blackboard had the highest part-worth utility with a coefficient of 0.78. The illustration of a traditional woman’s silhouette generated a part worth utility of 0.47 followed by the colour red bubbles (0.46), the display of a contemporary woman’s silhouette (0.39) and of a cute animal (giraffe) (0.34) (table 1).

**Table 1: Attributes and attribute levels of the TCA and results of the TCA**

Attribut	Attribute Level	Coefficient	Std. Error	P-value
<b>Colour</b>	red bubbles	0.46	0.10	0.000
	blue	0.16	0.09	0.079
	orange	base		
<b>Background element</b>	blackboard	0.78	0.10	0.000
	ribbon	0.03	0.10	0.775
	oval	base		
<b>Women’s silhouette</b>	traditional	0.47	0,10	0.000
	contemporary	0.40	0.09	0.000
	none	base		
<b>Nutritional information</b>	traffic light label	0.20	0.10	0.036
	detailed	0.03	0.09	0.709
	statement	0		
<b>Cute animal</b>	yes	0.34	0.07	0.000
	none	base		
	_cons	5.70	0,12	0.000

The three most important elements, influencing respondents to rate porridge packagings displaying them as attractive, are a blackboard, copied from a wax-print fabric, a pictorial display of the silhouette of a traditional woman and a red colour pattern, also copied from a wax-print fabric.

Theses three attributes all show symbols representing Beninese culture and traditions: The blackboard and the colour were taken from wax-print fabrics, significant parts of Beninese identity since the 18<sup>th</sup> century (Sylvanus 2007). The famous ‘Alphabete’ design displaying the blackboard was introduced into the market already in the 1920s (Vlisco 2020). The pictorial display of the traditional woman’s silhouette shows a woman, carrying a child on her back and a bowl on her head, an image depicting a situation to be seen all over rural Africa. Mohamed and Youssef (2014) imply that the use of design elements reflecting consumers’ history, culture and identity are rated favourable by consumers. Hapsari and Haryanto (2018) describe that the use of traditional symbols on packaging designs helps to establish a an emotional connection between the product and the consumer, leading to a strong intend of buying it.

Of lesser importance were the display of a contemporary woman’s silhouette as well as that one of a cute giraffe. The display of a cute animal, in this case a giraffe looking like a cartoon character, leads to a higher level of attractiveness in the case of packaged child food. Elliott & Truman (2020) found that cartoon characters are commonly used to indicate that food packages displaying such characters contain food specifically made for children. It can be assumed that the importance of the display of a cute cartoon animal on child food packaging is especially high in a location like Benin, where literacy rates are low (World Bank 2020) and consumers need help to identify child food items.

## Conclusions and Outlook

Our results indicate that packaging designs displaying traditional, culture specific symbols might attract Beninese child food customers. Additionally, a cartoon character, helping illiterate consumers to identify the product as child food, should also be present on the packaging. However, our model explains only about 12% of the data's variance and further research is therefore needed to determine other impacts like cultural and traditional influences on the consumers' perception of child food packaging design.

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