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Influence of front-of-pack design of child food products on the choice behaviour of Beninese customers

Iris Schröter^a, Ina Cramer^a, Georges Djohy^b, Marcus Mergenthaler^a

^a South Westphalia University of Applied Sciences, Department of Agriculture, Soest, Germany

^b University of Parakou, Faculty of Agronomy, Parakou, Benin

Abstract

The importance of Front-of-pack (FOP) design for targeting potential customers at the point of sale prompted the present experimental study in Banikoara and Nikki, northern Benin. The aim was to identify the most appealing FOP label design for child food products handcrafted by local women's groups from a set of design drafts. The label drafts were created by a local designer in collaboration with the women's groups. The preferences of potential customers regarding the colour scheme of the FOP label and the position of the women's groups' logo were investigated in a field experiment with 64 participants in Banikoara and 99 in Nikki. The results show that the tested FOP label design features had only a partial influence on the participants' choice behavior. The chosen packagings were generally rated as attractive, with higher ratings in Nikki than in Banikoara. The findings may be used to inform the refinement of the FOP design and the marketing strategy of the women's groups.

Introduction

Front of pack (FOP) design of child food products is considered a key factor influencing the purchasing decision at the point of sale, since FOP design elements may serve as eye-catcher, convey messages about the characteristics of the product and communicate brand identity (Silayoi and Speece 2007). Besides other FOP design elements appreciated by Beninese child food customers, such as appealing cartoon characters and pictorial representations of the product's ingredients (Schröter et al. 2023), the colour design and company logo may be of particular importance. Both design elements can influence visual attention, raise customer expectations regarding product features and may affect the customers' emotional response (Piqueras-Fiszman and Spence 2015; Sundar and Noseworthy 2014). In addition, a logo helps manufacturers to express their unique identity, to differentiate their products from those of competitors and serves as a recognition feature (Park et al. 2013).

This importance of FOP design prompted the present study, which aimed to support local women's groups in Nikki and Banikoara in northern Benin to develop an appealing FOP design for their artisanal child food products. To empower women to engage in income-generating activities, selected and co-developed traditional child food products were to be packaged and equipped with FOP labels that both address the identity of the food producing women's groups and the needs of the customers. Based on a series of previous conventional and participatory studies (Dogo et al. 2023; Schröter et al. 2023; Djohy and Lafia 2023), a local designer created drafts of the FOP design for four child food products. After an evaluation and selection process with the women's groups, the colour scheme and the position of the groups' logos were still up for discussion. To clarify this issue, a field experiment was conducted to investigate the influence of label background colour and

logo position on participants' choice behaviour, with the intention of identifying the FOP label design preferred by potential customers.



Material and Methods

Study locations and participants: The study was conducted at two sites in northern Benin, Nikki and Banikoara. These two districts are home to the women's groups producing the child food products for which the label design needed to be tested. In Banikoara, 64 women took part in the study. The women were on average 31.5 (SD = 12.7) years old and 58 of them stated that they care for on average 1.7 (SD = 1.1) preschool children. In Nikki, 99 women with an average age of 27.1 (SD = 9.6) years took part, 92 of whom stated that they care for on average 1.8 (SD = 1.1) preschool children. In Banikoara, 81% of the participants stated that they buy packaged child food at least once a week, while in Nikki the figure was 42%.

Packaging label variants: Packaging labels were created for the following child food products: Kpankpannu (Porridge) and Wagaru (Stew) for the women's groups in Banikoara; Kaladje Afuludje (Sweets) and Boyri Lamuni (Porridge) for those in Nikki. The packaging labels to be tested differed for each product in terms of the intensity of the background colour, which was either pale or intense, and the position of the logo, which was either at the top, i.e. in the top right corner, or at the bottom, i.e. in the bottom right corner.

Field experiment procedure: In order to obtain realistic results, a field experiment was carried out using the original products manufactured by the women's groups. The products were packaged in 500 g portions and labelled in the four design variants as shown in table 1. Simulating an open market situation, participants were asked to select one pack of each of the two products offered at the respective location, to rate the attractiveness of the label designs chosen and to provide an estimate of the realistic product price and the maximum price they would be prepared to pay for the respective product. Each individual was financially compensated for participating in the study.

Table 1: Packaging label variants offered for choice for each location and product

Location	Type of food	Design variants			
		pale ¹ / bottom ²	pale ¹ / top ²	intense ¹ / bottom ²	intense ¹ / top ²
Bani- koara	Kpankpannu (Porridge)				
	Wagaru (Stew)				
Nikki	Kaladje Afuludje (Sweets)				
	Boyri Lamuni (Porridge)				

Note: ¹characteristic of background colour, ²logo's position

Results and Discussion

Table 2 shows the label variant chosen by the participants for each product. The participants in Banikoara most frequently chose the packaging with the label variant with a light background colour and the logo positioned at the top for Kpankpannu and the variant with the intense background colour and the logo positioned at the top for Wagaru. In Nikki, the majority of participants decided in favour of the label variant with an intense background colour and the logo positioned at the bottom for Kaladje Afuludje. For Boyri Lamuni, the label variant with a pale background colour and logo positioned at the top was chosen most frequently, closely followed by the exact opposite label design, i.e. with an intense background colour and logo positioned at the bottom.

Table 2: Percentage of participants choosing the respective label design, split by product

		pale ¹ /bottom ²	pale ¹ /top ²	intense ¹ /bottom ²	intense ¹ /top ²
Banikoara (n = 64)	Kpankpannu	15.63	34.38	20.31	29.69
	Wagaru	23.81	7.94	30.16	38.10
Nikki (n = 99)	Kaladje Afuludje	22.22	11.11	56.57	10.10
	Boyri Lamuni	15.31	38.78	37.76	8.16

Note: ¹characteristic of background colour, ²logo's position

The results of the clogit model calculated to estimate the main effects of the intentionally varied characteristics of the labels, i.e. background colour and position of the logo, on the choice decision are shown for both products offered in Banikoara in Table 3 and for both products offered in Nikki in Table 4.

Table 3: Results of the Clogit model for the products offered for choice in Banikoara

Test statistics	Kpankpannu		Wagaru	
	$P = 0.077$	Pseudo $R^2 = 0.029$	$P = 0.011$	Pseudo $R^2 = 0.052$
	OR [95% CI]	P - value	OR [95% CI]	P - value
Attributes				
colour intense (base: pale)	1.00 [0.61, 1.63]	1.00	2.15 [1.26, 3.65]	0.01
logo top (base: bottom)	1.78 [1.07, 2.97]	0.03	0.85 [0.52, 1.40]	0.53

For Kpankpannu, the model only tended to be significant ($p < 0.1$). While an odds ratio of 1 is a clear indication that the background colour had no influence on the choice of packaging, the positioning of the logo at the top appeared to have a positive influence on the participants' choice decision. For Wagaru, on the other hand, the intense colour increased the likelihood of the packaging being selected, while the logo had no influence.

Table 4 Results of the Clogit model for the products offered for choice in Nikki

Test statistics	Kaladje Afuludje		Boyri Lamuni	
	$P < 0.001$	Pseudo $R^2 = 0.168$	$P = 0.600$	Pseudo $R^2 = 0.004$
	OR [95% CI]	P - value	OR [95% CI]	P - value
Attributes				
colour intense (base: pale)	2.00 [1.32, 3.04]	< 0.001	0.85 [0.57, 1.26]	0.42
logo top (base: bottom)	0.27 [0.17, 0.44]	< 0.001	0.88 [0.59, 1.32]	0.55

For Kaladje Afuludje, the likelihood of a packaging being chosen by the participants increased if the label had an intense background colour and the logo was positioned at the bottom. For Byori Lamuni, neither the background colour nor the position of the logo had any influence.

Based on the selected label variants, the participants rated the attractiveness of the packaging on a scale from 1 (low) to 5 (high) on average as follows: Kpankpannu 4.0 (SD = 1.1), Wagaru 4.0 (SD = 1.0), Kaladje Afuludje 4.5 (SD = 0.6) and Boyri Lamuni 4.7 (SD = 0.5). The attractiveness ratings differed significantly between the products, $F(3, 320) = 16.34$, $p < 0.001$. The Bonferroni

post-hoc analysis indicated significant differences ($p < 0.05$) between those products offered at different locations, while the products offered at the same location did not differ with regard to the attractiveness ratings.

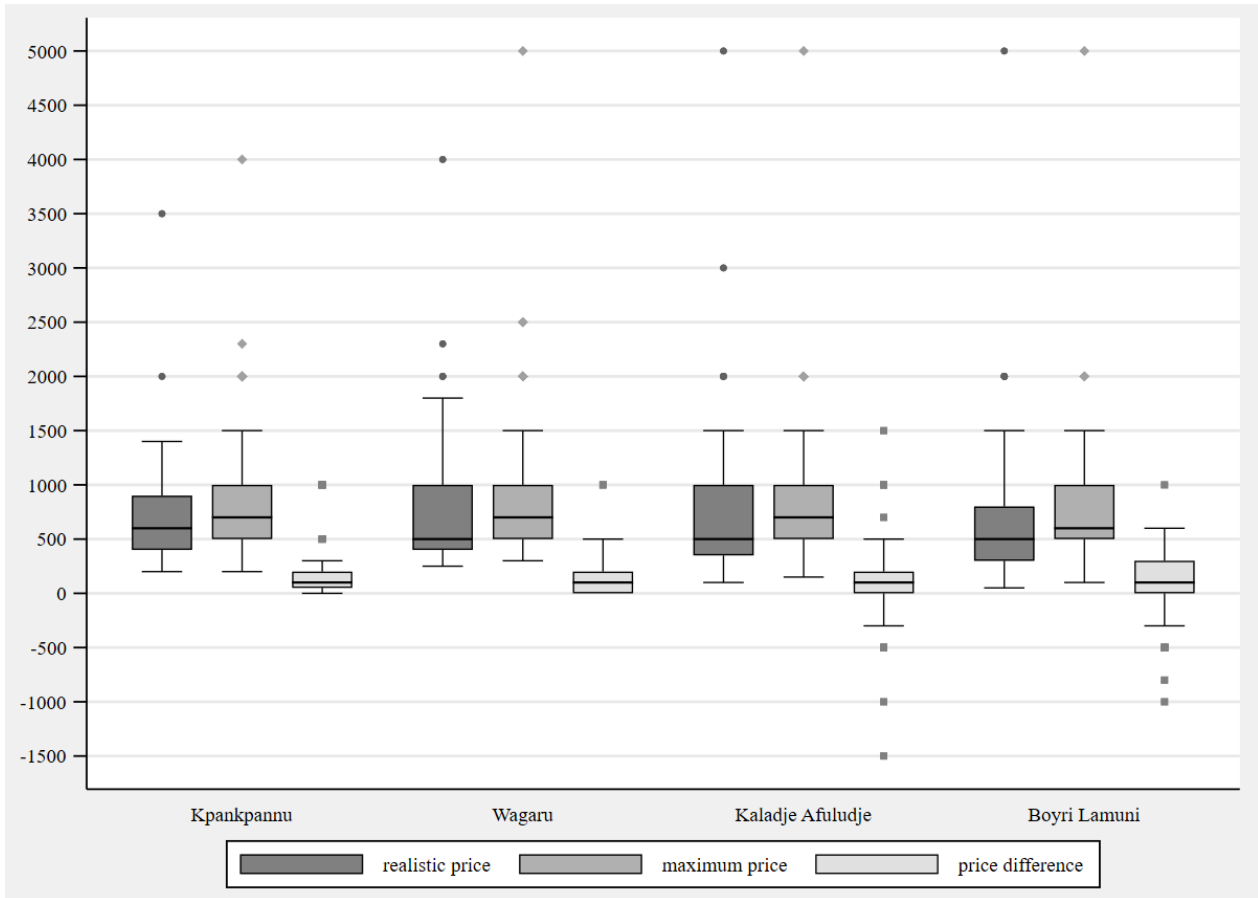


Figure 1: Price indications (realistic price and maximum price) and difference between maximum price and realistic price in XOF

Even though the products belonged to different categories (porridge, stew, sweets), the mean values reported as realistic prices were similar for all products [$F(3, 320) = 0.45, P = 0.720$] with XOF 702 (SD = 485) for Kpankpannu, 766 (SD = 617) for Wagaru, 743 (SD = 640) for Kaladje Afuludje and 666 (SD = 630) for Boyri Lamuni. The same applied to the prices participants reported as maximum prices [$F(3, 320) = 0.96, P = 0.423$] with an average of 891 (SD = 629) XOF for Kpankpannu, 940 (SD = 759) for Wagaru, 848 (SD = 631) for Kaladje Afuludje and 772 (SD = 594) for Boyri Lamuni. For all products, however, the reported prices covered a wide range (figure 1). In Banikoara, all respondents indicated that they would be willing to pay a maximum price equal to or higher than the price they considered realistic. In Nikki, however, approximately 20% of participants indicated a maximum price lower than the realistic price for both products.

Discussion

The aim of this study was to investigate the perception and impact of the FOP label design on the choice behaviour of potential customers of child food products. The results showed that the design variants examined only had limited influence on choice behaviour. While the colour scheme did not play a role in the choice of porridge (Kpankpannu in Banikoara and Boyri Lamuni in Nikki), the intense colour variant was preferred for both Wagaru and Kaladje Afuludje. For Kpankpannu, the participants tended to favour the label with the logo positioned at the bottom, whereas for Kaladje Afuludje the packaging with the logo positioned at the top was preferred. A recommendation can only be derived from these results for the label designs examined, but not a general recommendation for a colour scheme or logo position that can be transferred to other FOP

labels. This could also be due to the fact that, in addition to the targeted experimental manipulation of the colour scheme and logo position, the use of artistic licence by the local designer also led to a change in other parameters (e.g. arrangement and colour of the lettering and the depicted ingredients; different size of the logo) which could have biased the results. It could also be that the intensity of the background colour was not sufficiently different, at least for the two porridges, to influence the choice behaviour.

The FOP label designs chosen by each participant were rated as generally attractive, as indicated by a mean score for all products above the median of the scale of 3. However, the ratings in Banikoara were lower than in Nikki, which could be due to the fact that women in Banikoara are more likely to buy packaged child food and may therefore be more accustomed to attractive packaging label designs and thus have higher expectations. It might be possible that the use of more bright, intense colours and an increased use of the colour red could make the labels even more attractive (Schröter et al. 2023; Swana and De Lange 2015).

The wide range of prices given for the products indicates uncertainty in the assessment of the product value and therefore a need for information regarding the products and their potential benefits for child nutrition. This need for information is underlined by the finding that some of the respondents in Nikki seem to assume that the products are not affordable for them, as they indicated a lower price as the maximum price they would pay for the product than the price they consider realistic for the product. However, even more information and an appealing packaging design cannot solve the problem that some of the participants may indeed not be able to afford the products financially. Strategically, it could be a good idea for the women's groups to target other or additional customer groups, especially those who attach greater importance to convenience.

Conclusions and Outlook

The FOP label designs for child food products examined in this study were rated generally as attractive, but ratings and preferences varied depending on location and product. The results indicate that, in addition to design, customers' information needs should also be taken into account in order to successfully market the products. One possible strategy for the women's groups could be to target additional customer groups who emphasize convenience and for whom the products are affordable.

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