Characterising ratings of 12 commonly consumed foods with respect to a set of desirability attributes in a survey on women's dietary habits in rural Uganda.

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Introduction:

Research, in high income countries, shows that high maternal workloads have an important influence on food choice [1]. The impact of women's workload on food choice among rural women living in LMICs, however, is largely unknown. Investigating such food choices motivated a research project funded by Drivers of Food Choice grant programme that surveyed a sample of women from rural villages in Uganda for dietary and time-use habits. The questionnaire also gave the opportunity to collect information on women's own view regarding some foods commonly consumed in the local setting. In particular, the study participants in the Drivers of Food Choice study have been presented with a survey questionnaire asking them to rate 12 foods selected from typical diet in rural Uganda: yellow sweet potato, beans, jackfruit, doodo (amaranthus), maize, tomato, milk, mango, mukene (silver cyprinid also known as Lake Victoria sardines), groundnuts, egg and matooke (East African highland banana), with respect to 6 attributes: cheapness, accessibility, deliciousness, healthiness, quickness to prepare, quickness to cook.

Objective:

The aim of this study is to characterise the food ratings in this survey of Ugandan women in rural settings, at population level. In particular, specific objectives are: to find similarities in food rating profiles across attributes and in attributes profiles across foods, as well as finding association between foods and attributes.

Methods:

The data were collected in the context of a Drivers of Food Choice project whereby a cross-sectional survey of mothers and children age 12 to 23 months (n=226) was conducted between January and February 2018 from 18 villages in the Bugiri and Kamuli Districts, Eastern Region, Uganda. Within a general questionnaire survey administered by trained interviewers, 206 women rated twelve foods from 1 to 4 (corresponding to definitely (4), moderately (3), moderately not (2), definitely not (1)) for each of 6 attributes: cheapness, accessibility, deliciousness, healthiness, quickness to prepare, quickness to cook . Average rating for each combination of foods and attribute across women were then obtained and the resulting 12*6 matrix (i.e. 12 foods by 6 attributes) was the basis for the following analysis.

Correspondence analysis [2],[3],[4] was applied to such matrix first. This technique is often applied to analyse contingency tables, i.e. matrix of counts, but may also be utilised when the character in the cells is a different type of measure, like the ratings of an attribute. This allows us to study the relationship between rows and columns (foods and attributes) by a visual technique, the biplot, that displays in the same graph a projection of categories of both variables (foods and attributes) on the axes of principal inertia (deviation from the condition of independence of the two variables). The origin of the plot corresponds to the average profile for both rows (foods) and columns (attributes). Similarity between food profiles or attribute profiles is reflected in their respective proximity in the graph. Results are displayed in a symmetric coordinates biplot whereby foods and attributes that are furthest from the origin and mostly aligned on the same direction away from the origin can be regarded as most positively related.
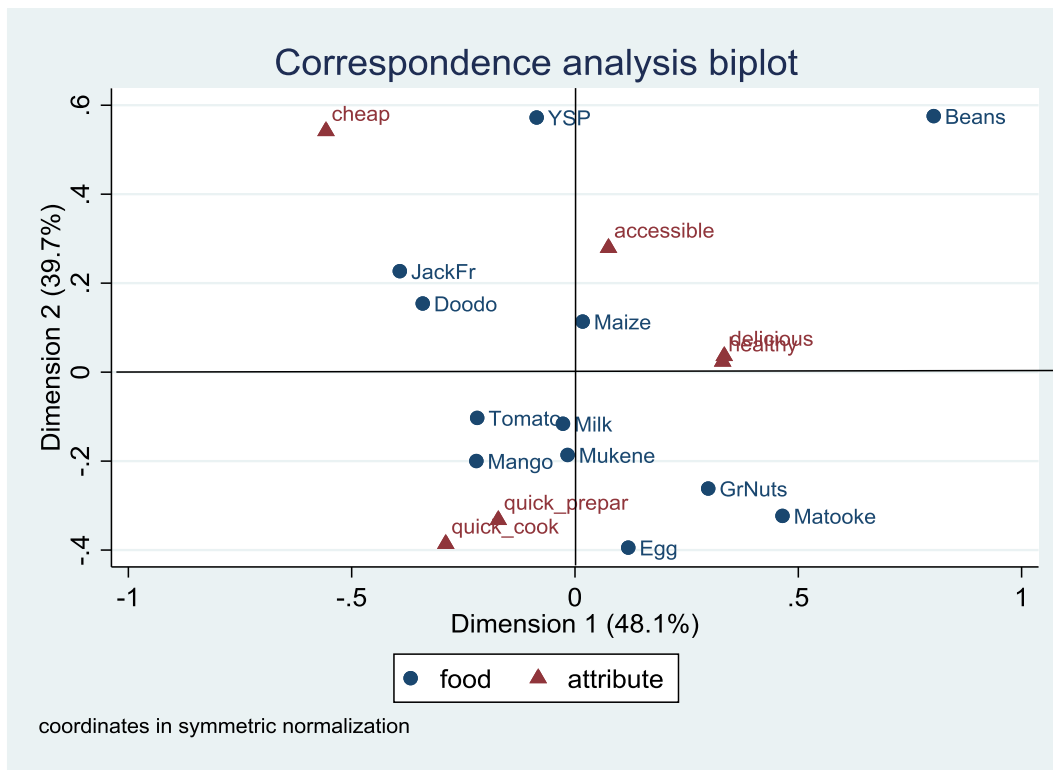
Results:

Figure 1: Correspondence Analysis Biplot, accounting for nearly 87.8% of total system inertia.

From Correspondence Analysis biplot (Figure 1), representing 87.8% of the system inertia, the pair of attributes that have very similar ratings across foods appear to be: quickness to prepare and quickness to cook (lower left quadrant) ; deliciousness and healthiness (upper right quadrant) which almost completely overlap. Furthermore, the pair of foods that appear to have most similar ratings across attributes are: 1) jackfruit and doodo (upper left); 2) tomato and mango (lower left); 3) groundnuts and matooke (lower right); 4) milk and mukene (lower left). As regards the association between categories of different variables, jackfruit and doodo appear to be associated with cheapness and mango (and to some extent also milk, mukene and tomato) with quickness to prepare/cook.

Discussion

A multivariate analysis of healthy foods rated on a scale 1-4 for desirable attributes by women in rural settings in Uganda (as part of a Drivers of Food Choice study) highlighted, at population level, very little variability in the delicious and healthy quality of the foods, which indicates that women in those settings tend to recognise the healthiness of the foods and associate healthiness with a pleasant taste or alternatively attribute healthiness to foods that they find delicious: the causal direction of this association remains to be determined. The variation in the average ratings appear mostly linked to the ease in cultivating locally or retrieving at local markets such foods and in the economic capacity to buy them in settings with very limited financial resources. In particular it appears that the vegetables doodo and jackfruit are the products with the best ratings across all attributes, being especially cheap (unlike tomato which shares with them similar ratings). It should be noted that doodo, jackfruit and mango are available as foods that grow naturally in the wild and so might have no economic costs at all for households in rural settings. Animal products like milk and mukene have similar ratings across all "practical" attributes but they score much lower for cheapness. Even worse for cheapness are eggs which, like groundnuts, however, have a somewhat lower accessibility in women's view. Finally some non–cheap plant-based products like beans, which are rich in both proteins and micronutrients, are also deemed long to prepare/cook.

Conclusion

The access to nutrient-dense foods that can be cultivated in the household or easily accessed and prepared remains the cheapest channel towards healthy food consumption. However to promote a balanced and diverse diet, policies should be put in place to make nutrient-dense products, like eggs, mukene and beans cheaper, more accessible and/or easier to prepare in rural households in Uganda. In particular Social and Behaviour Change Communication programmes should be put in place to raise awareness of nutritious foods and promote consumption for most vulnerable populations (like pregnant and lactating women and infants) , as well as programmes for the identification and distribution of other nutrition-dense foods not currently available in this food environment, such as orange-fleshed sweet potato, iron-rich beans.

Finally, in order to better elucidate the determinants of food choice at the individual, rather than population level, we next plan to study the relationship between the ratings expressed and the actual reported weekly consumption for the twelve rated foods, as well as the use of time to prepare such foods.

References

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Poster

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