

# Individual repeatability in projective mapping: use of hierarchical cluster analysis



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## INTRODUCTION

Commonly, the global repeatability of the results obtained using projective mapping is analysed by including blind duplicated samples on the sample set. Then, the repeatability is evaluated by comparing their positions on the product spaces obtained. This approach can assess the panel performance but is unable to provide information about the individual repeatability.

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## OBJECTIVE

The objective of this work was to explore the evaluation of the individual repeatability on projective mapping data by using hierarchical cluster analysis.

# METHODOLOGY

## 1 PROJECTIVE MAPPING

Four different projective mapping (PM) data were carried out: drinkable yoghurts (two sessions, 13 assessors), Spreadable processed cheese (12 assessors), and Orange flavoured drinks (13 assessors).

In all PM tasks, a blind duplicated sample was included.

Different semi-trained assessor's panels carried out all PM Sessions.

## 2 DATA ANALYSIS

Hierarchical cluster analysis (HCA) on the individual coordinates of the PM data was performed using Euclidean distances and Ward's linkage to evaluate the performance of each assessor.

Multiple factorial analysis (MFA) was carried out considering the coordinates of each assessor as a different group of variables.

Confidences ellipses (95%) were calculated using truncated total bootstrapping considering the first three dimensions of the MFA.

Data were analysed using XL-Stat 2020, FactoMineR and SensoMineR in R language.

# RESULTS

The findings showed that using HCA on individual data was helpful to identify unreliable assessors on all PM data sets evaluated (Table 1). Analyzing data (MFA) taking into account only reliable assessors resulted in a higher explained variance compared with considering all assessors' data.

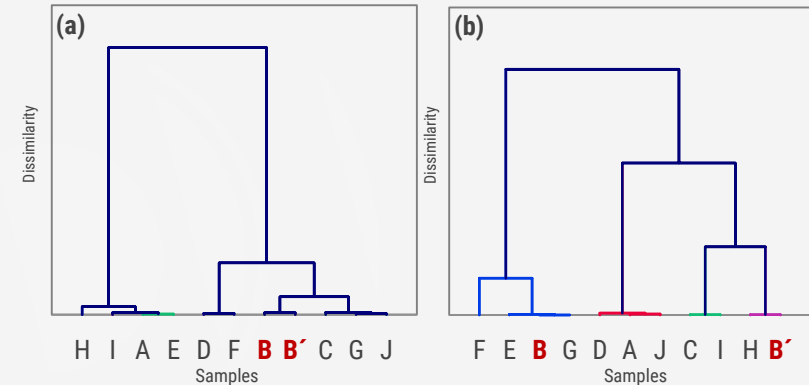
**Table 1.** Assessors, reliable assessors and MFA explained variance for each PM session.

PM Session	Assessors	Reliable assessors	E. Variance MFA (a)	E. Variance MFA (b)
Yoghurts 1	13	10	64 %	69 %
Yoghurts 2	13	10	67 %	69 %
Orange flavoured drinks	13	9	60 %	70 %
Spreadable cheese	12	10	63 %	68 %

(a) obtained with all assessor's data (b) obtained with only reliable assessor's data.

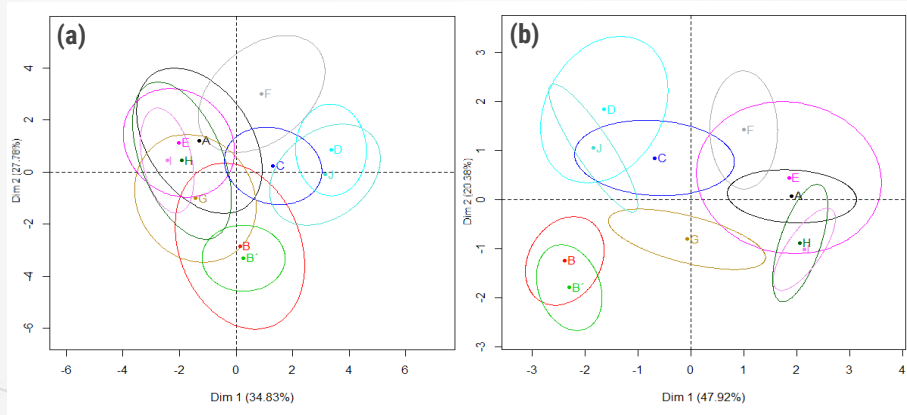
Figure 1 shows examples of dendrograms from HCA of reliable and unreliable individual data. Individual data was considered reliable if the duplicated samples were located on the same group according to the obtained dendrogram.

**Figure 1.** An example of dendrograms obtained from HCA of individual data. Reliable assessor (a), unreliable assessor (b).



# RESULTS

**Figure 2.** An example of product configurations in the first and second dimensions of the MFA (a) obtained with all assessor's data (b) obtained with only reliable assessor's data.



When comparing the results of the MFA (a) and MFA (b), it was found that if unreliable assessors were not taken into account in the analysis, confidence ellipses were lower and less overlapping, increasing discrimination among samples (Figure 2). This pattern was observed on the results of all PM sessions analysed.

# CONCLUSIONS

The study demonstrated that the inclusion of blind duplicated samples on PM and the use of HCA to analyse individual repeatability might be a useful complement to improve the results obtained by the use of PM with semi-trained assessors.