

## Accepted Manuscript

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PII: S0950-3293(18)30060-0

DOI: <https://doi.org/10.1016/j.foodqual.2018.01.011>

Reference: FQAP 3455

To appear in: *Food Quality and Preference*

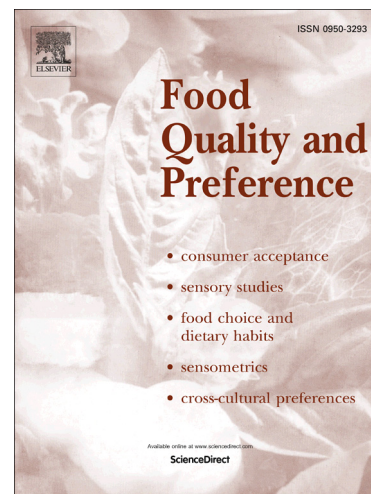
Received Date: 13 June 2017

Revised Date: 18 January 2018

Accepted Date: 19 January 2018

Please cite this article as: Cariou, V., Qannari, E.M., Statistical treatment of free sorting data by means of correspondence and cluster analyses, *Food Quality and Preference* (2018), doi: <https://doi.org/10.1016/j.foodqual.2018.01.011>

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# Statistical treatment of free sorting data by means of correspondence and cluster analyses

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## **Abstract**

Several statistical procedures have been proposed for the analysis of the data from a free sorting task. A straightforward strategy of analysis based on correspondence analysis and cluster analysis performed on the co-occurrence matrix is proposed herein. More specifically, two situations are considered depending on whether the aim is to depict the relationships among the stimuli or to investigate the agreement among the subjects. The approach of analysis is illustrated on the basis of free sorting data characterizing chocolate products.

**Keywords:** free sorting; co-occurrence matrix; correspondence analysis; cluster analysis.

## **1. Introduction**

Practitioners in sensory analysis and consumer research are increasingly using rapid techniques of data collection that directly involve the consumers. Besides being simple, time saving and cost effective, these techniques make it possible to shed light on how the products are perceived and get insight into consumer choice and behavior. For a comprehensive exposition of the new rapid techniques used in sensory and preference studies, we refer to the book edited by Delarue, Ben Lawlor and Rogeaux (2015).

Among these techniques, we focus herein on the free sorting procedure (Coxon, 1999). In this procedure, the subjects are presented with a set of stimuli and instructed to sort them in as many groups as they believe is necessary with the understanding that the stimuli are assumed to be similar to each other within each group and differ from the stimuli that are sorted in other groups. For an overview of the statistical methods used in this context, we refer to a paper by Courcoux, Qannari and Faye (2015). These methods can be classified in two families, namely (i) factor analytical methods including, in particular, multidimensional scaling (Carroll and Chang, 1970; Van der Kloot and Van Herk, 1991; Lawless, Sheng and Knoop, 1995;

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