

## **Principles of Multivariate Statistics in Sensory and Consumer Research**

### ***Using PCA, Correspondence Analysis, and Cluster Analysis***

**Instructors:** Carlos Gomez-Corona<sup>1</sup>, Yoan Goupil<sup>2</sup>, Carina Muller-Spiegel<sup>3</sup>

<sup>1</sup> dsm-firmenich, France; <sup>2</sup> dsm-firmenich, Switzerland; <sup>3</sup> dsm-firmenich, Austria.

Sensory and consumer research often generates complex datasets, whether through descriptive analysis, consumer liking tests, projective mapping, categorical responses, or multi-product comparisons. These datasets frequently involve multiple variables, multiple products, and sometimes multiple consumer segments. To extract meaningful insights, multivariate statistical techniques are essential.

This tutorial introduces participants to three foundational multivariate methods widely used in sensory and consumer science: **Principal Component Analysis (PCA)**, **Correspondence Analysis (CA)**, and **Cluster Analysis**. These techniques enable the reduction of data complexity, the visualization of product and attribute relationships, the analysis of categorical or frequency-based data (e.g., CATA, check-all-that-apply), and the identification of natural groupings among consumers or products.

The session will focus on the core principles behind each method (how they work, when to use them, and how to interpret their outputs) while emphasizing practical applications common in the field. Through hands-on exercises using a provided dataset, participants will learn how to:

1. **Apply PCA** to sensory profiling data to visualize product spaces, identify key drivers, and build interpretable sensory maps. And its uses in consumer insights too!
2. **Use Correspondence Analysis** for categorical sensory and consumer data, such as CATA responses or contingency tables, to explore associations between products, attributes, and consumer segments.
3. **Perform Cluster Analysis** to identify homogeneous groups of consumers or products, compare segment profiles, and integrate segmentation with sensory and hedonic results.

By the end of the tutorial, participants will have a solid understanding of the logic behind these multivariate techniques, how to implement them using statistical software, and how to interpret and communicate the resulting visualizations in a way that supports decision-making in R&D, sensory science, and consumer insights.

**Duration**

3 hours

**Audience**

Sensory and consumer scientists, insights professionals, data analysts, and researchers interested in strengthening their statistical toolkit for analyzing multi-variable sensory and consumer datasets.

**Background Required**

Participants should have basic knowledge of sensory and consumer data (e.g., sensory profiling, consumer liking tests) and fundamental familiarity with statistical analysis. No prior experience with multivariate statistics is required, but general comfort with data manipulation is helpful.

**Laptop Requirements**

All attendees must bring a laptop with a statistical analysis tool. The course will use XLSTAT as software for analysis.