

You know what you like,
but what about everyone else?

A Case study on
Incomplete Block Segmentation
of white-bread consumers.

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Abstract

“One man’s meat is another man’s poison.”

There will always be a wide range of consumer liking response across any product category. Cluster analysis can provide consumer segments based upon common liking that reflect underlying sensory preferences.

To determine valid population segments requires a large sample of consumers. As the number of products tested by each consumer increases experimental bias degrades the data quality. A limited number of well-designed incomplete sample sets can provide cleaner responses.

The challenge in this study was to collect 200 valid consumer responses for each of 12 commercial white breads whilst minimizing fatigue.



What we know about consumers

- There is no such person as an “average” consumer.
- There is no product that is “universally” liked, even water.
- Traditional demographics are no indicator of consumer preference
- Consumers Lie!

What we know about products

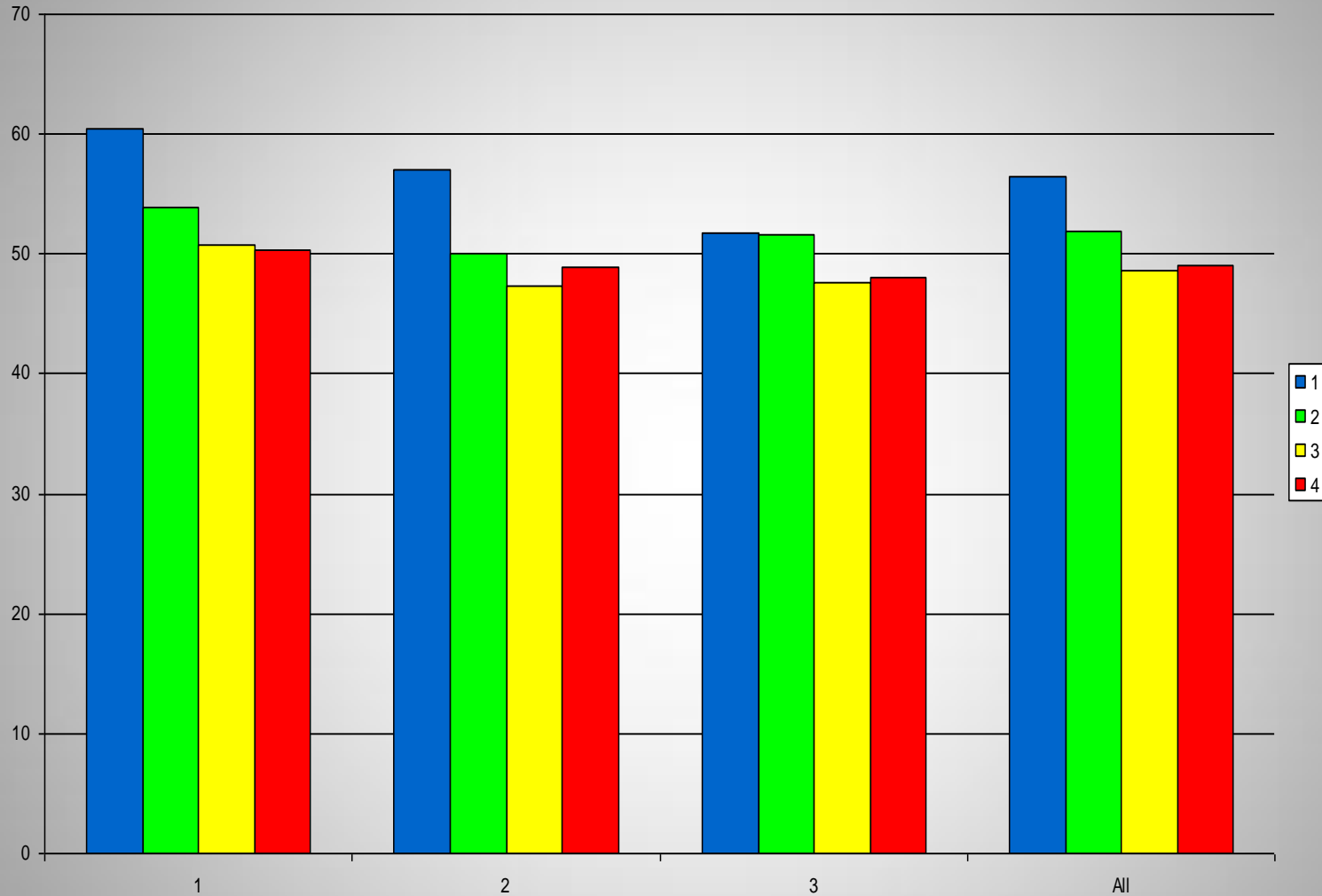
- There is no product that is “universally” liked, even water.
- Optimization of products is desirable from the point of view of efficiency and market
- To optimize, you must have a clear target.
- Unless you segment your consumers based upon their sensory preference you will not have a clear target.

Consumer Segmentation of BIB liking data of 12 Cabernet Sauvignon wines

- Consumer testing of beverage alcohol has a number of serious challenges. The effect of consumption of alcohol is a limiting factor in obtaining complete block data.
- Collecting consumer data over several days affects the quality of the consumer response. By the third day, most consumers are behaving like experts, a conclusion that is supported by the decrease in first position effect.

The Effect of Order and Day on Consumer Liking

12 White Wines, 115 Consumers, CBD 12:12 over 3 Days



- Typically, segmentation of consumer liking data requires a complete block.
- In this study, 12 Cabernet Sauvignon wines were evaluated by over 600 red wine consumers in a 12 present 3 Balanced Incomplete Block design. Each consumer tasted 3 of the wines in a single 10 minute session, with demographic questions providing a break between samples.
- A total of 11 sessions were conducted at 5 LCBO store locations.



Data collection at LCBO stores

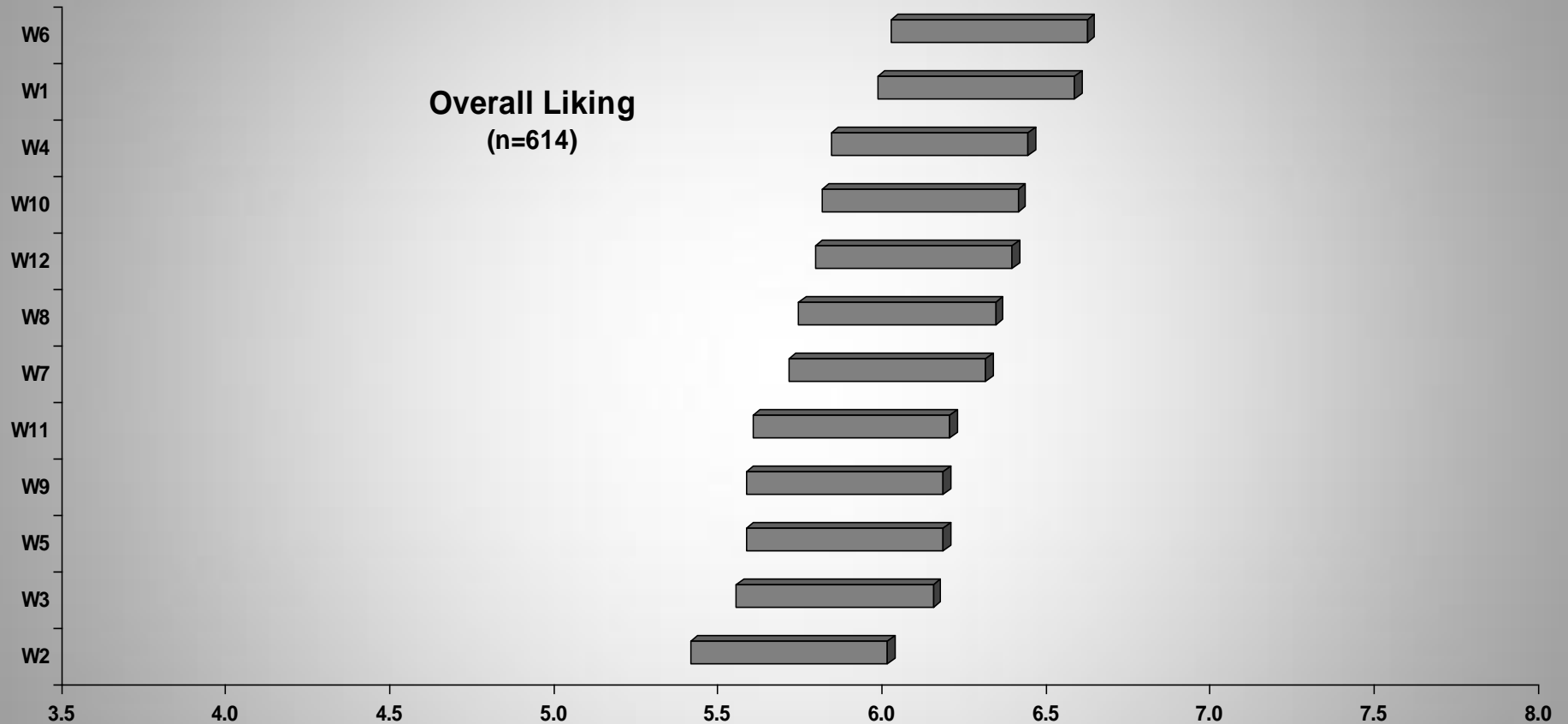


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Mean Liking across All Consumers

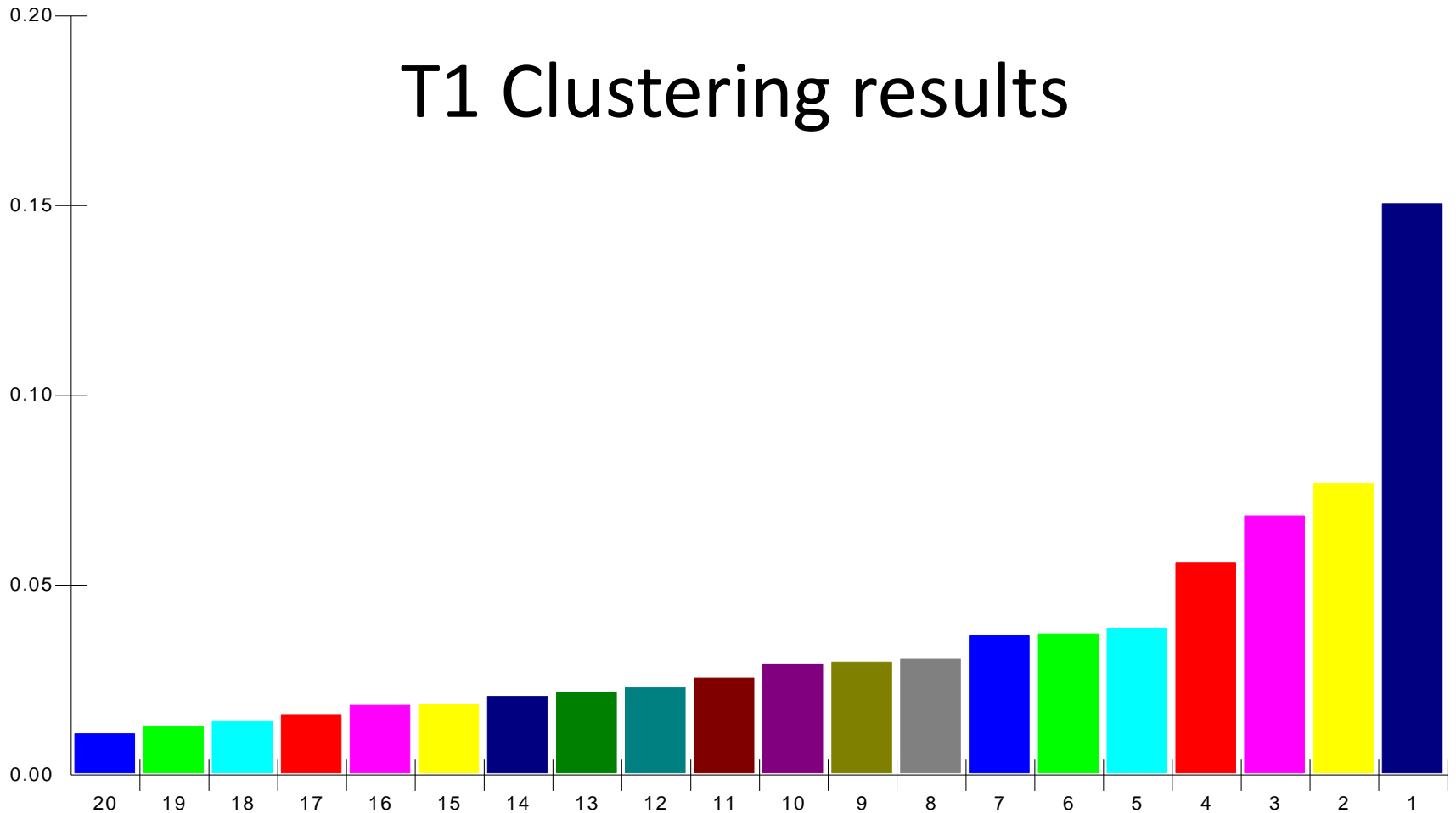


Segmentation Procedure

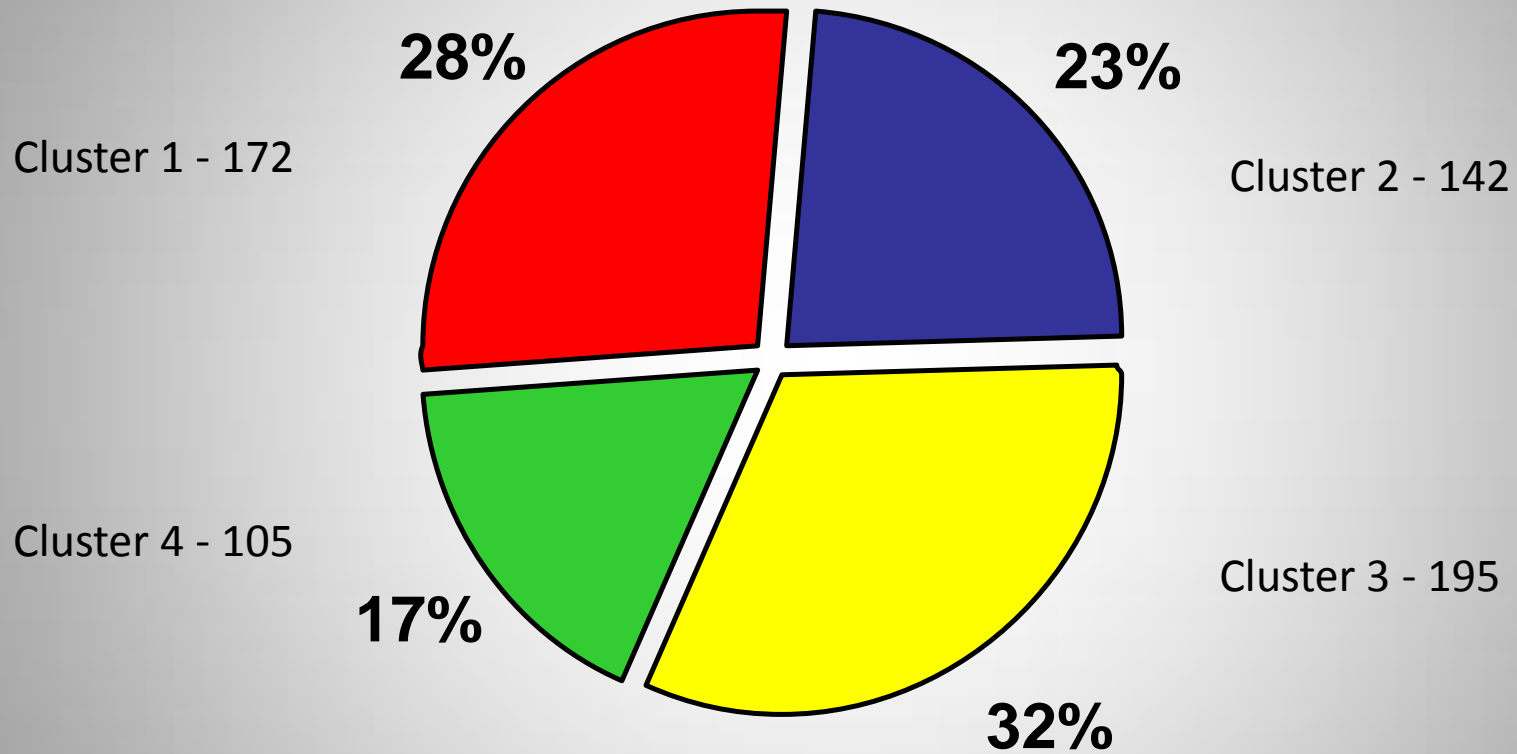
- Substitute missing data with for each panelist
 1. Panelist Mean for the 3 products tested
 2. Product mean for each product
 3. Grand mean for all products
- Cluster using Qannari method using Senstools 3.3.1 (OP&P, Utrecht)
- Apply the cluster solutions to the original data to create segments

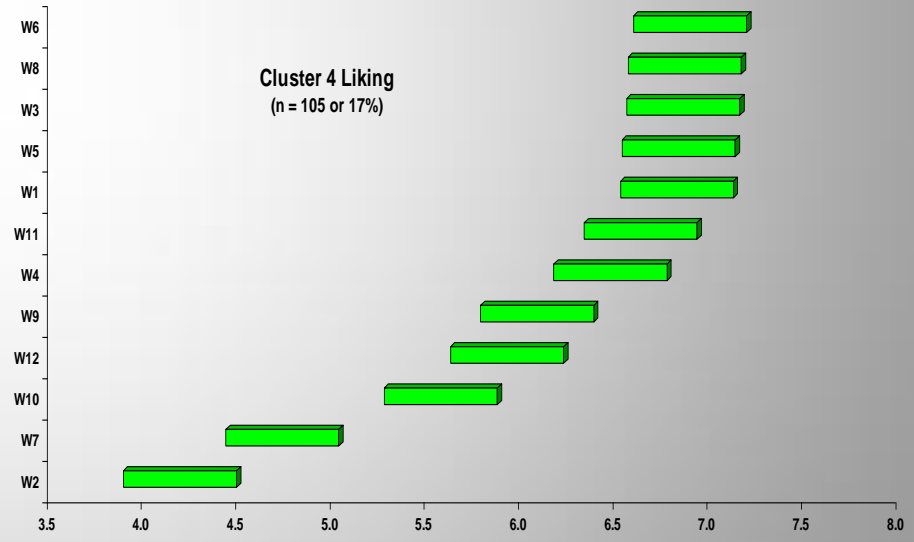
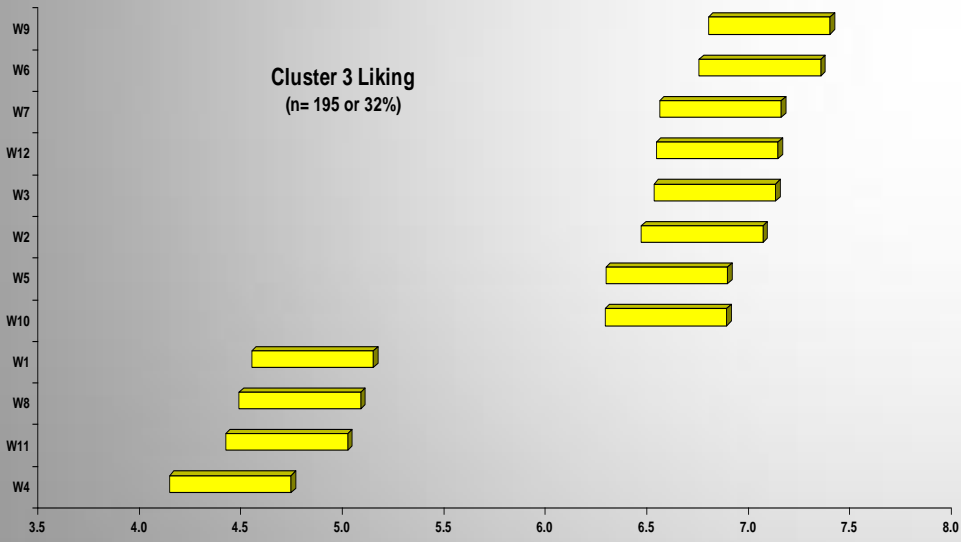
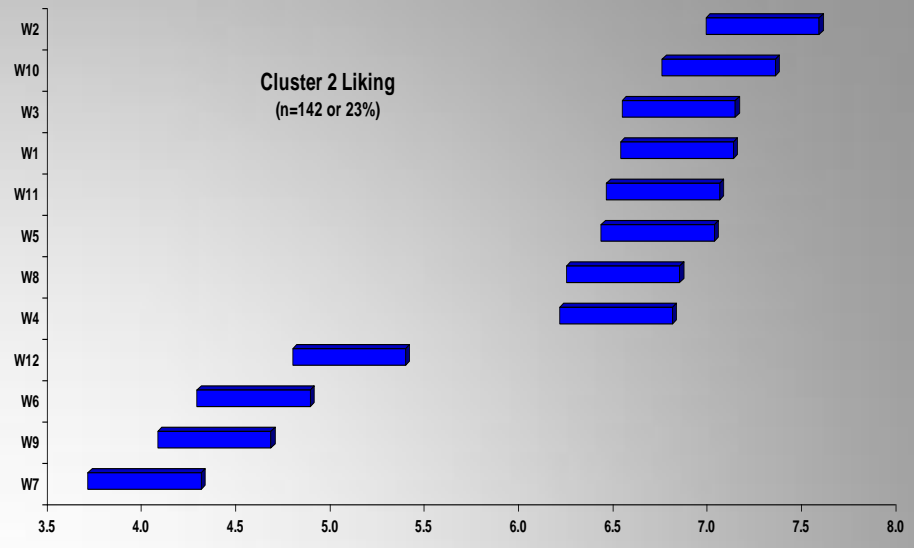
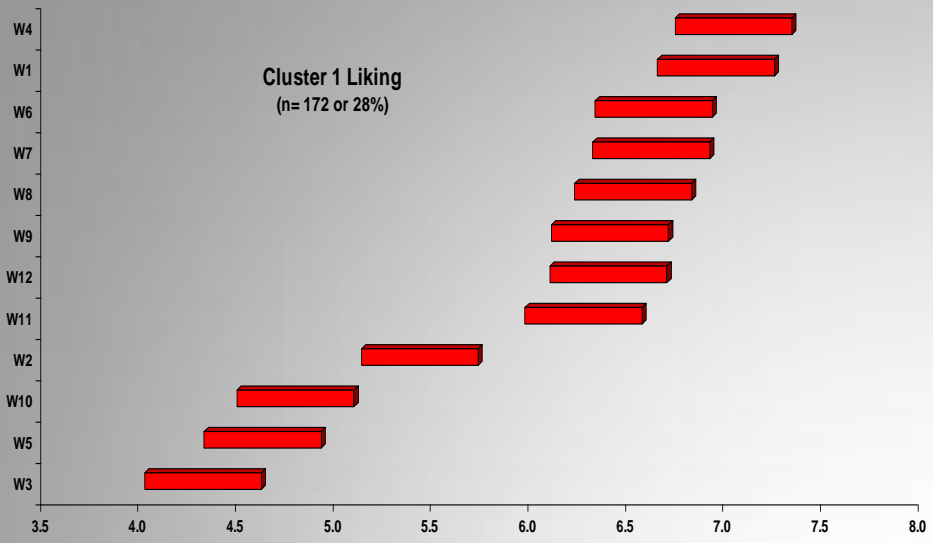
Increase Relative Stress By Decreasing Number Of Clusters

T1 Clustering results

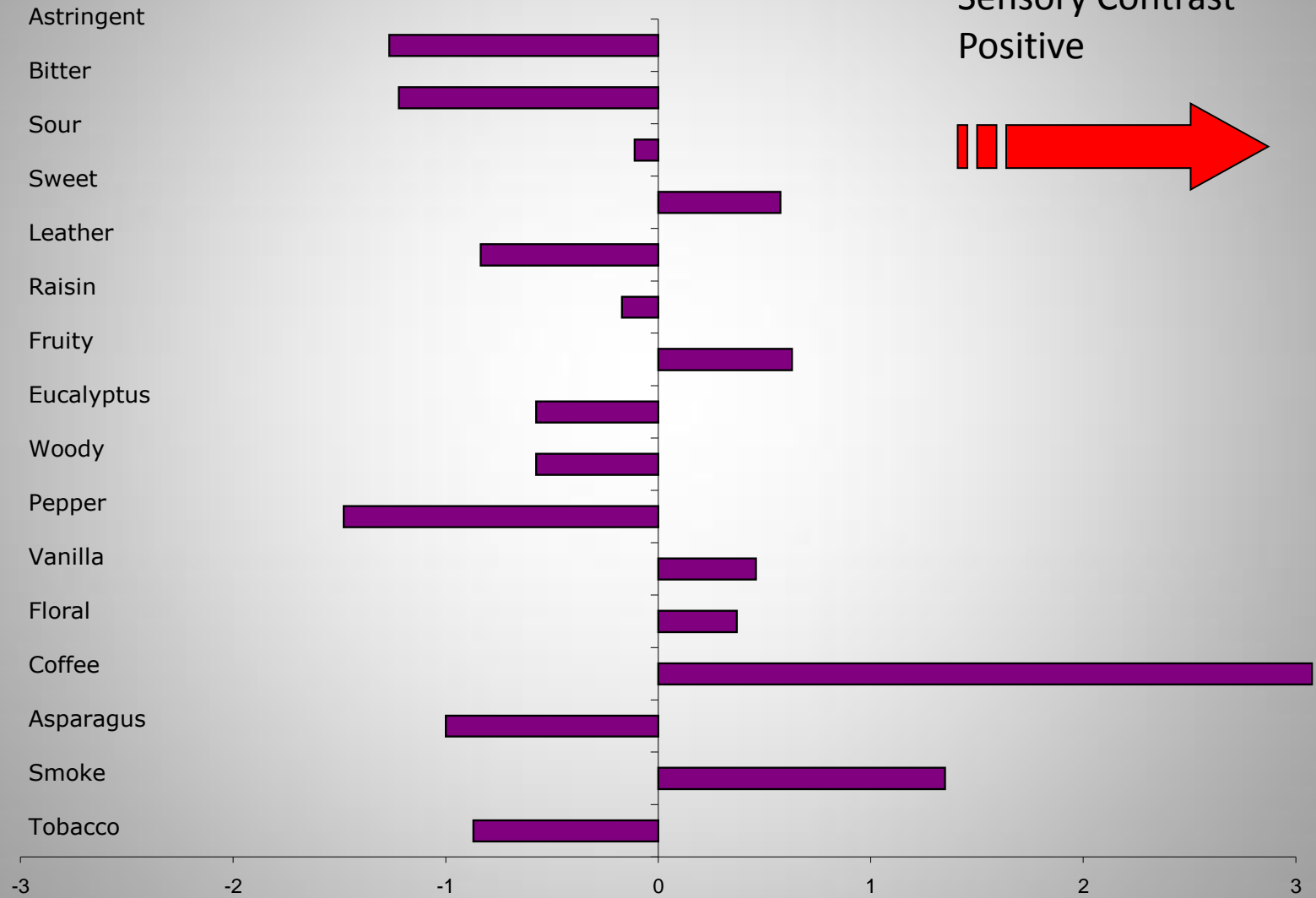


Clusters

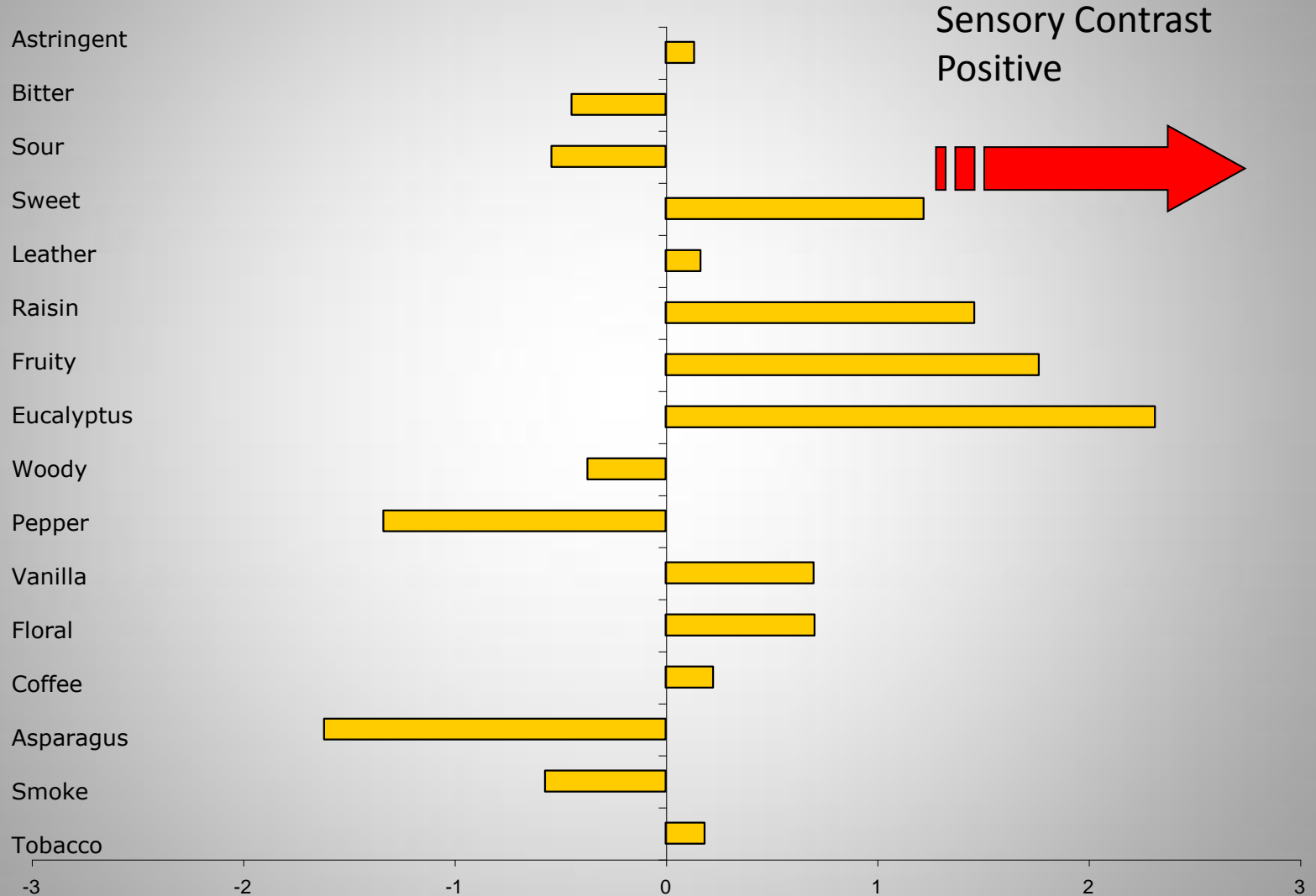




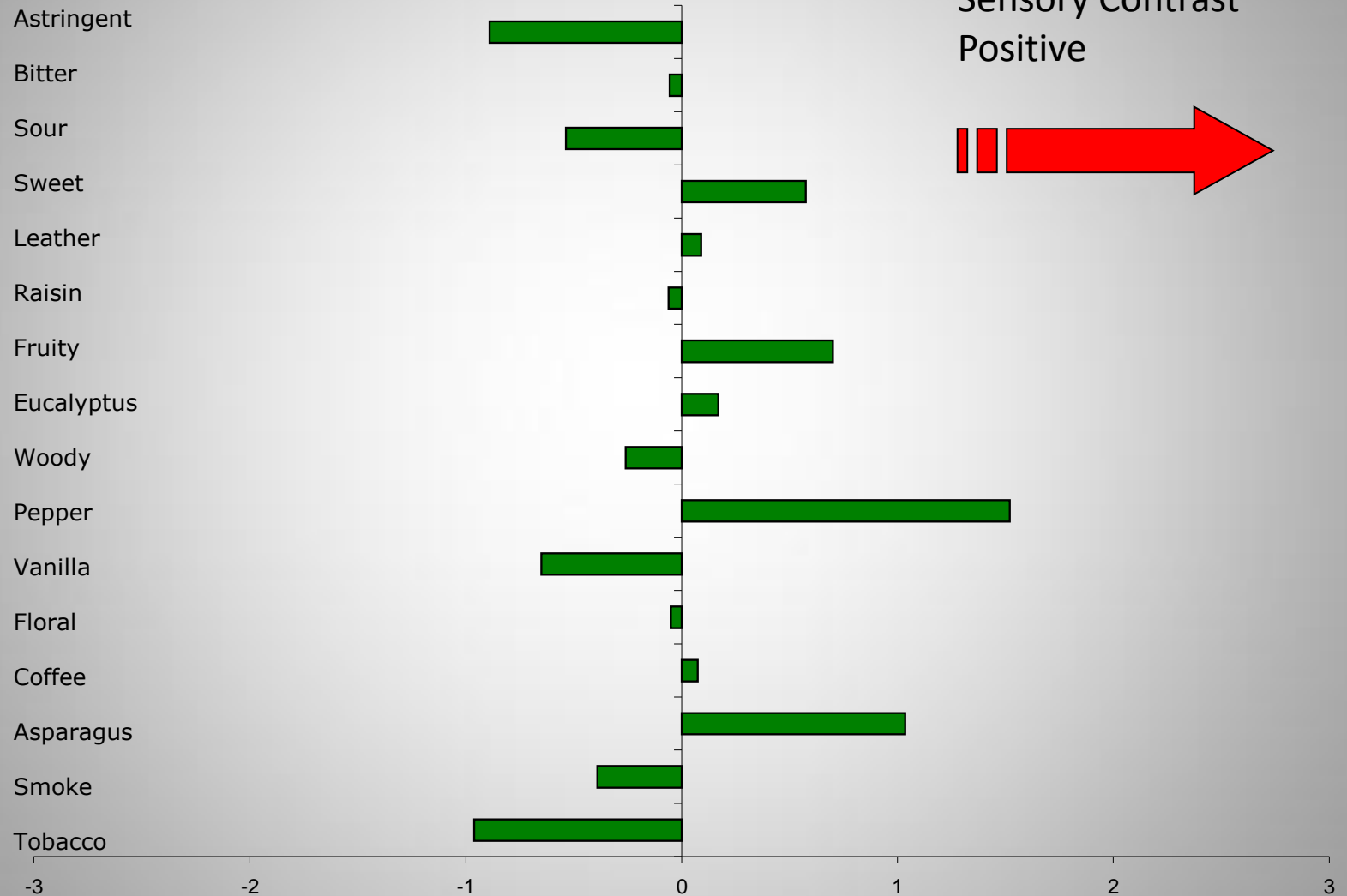
Cluster 1



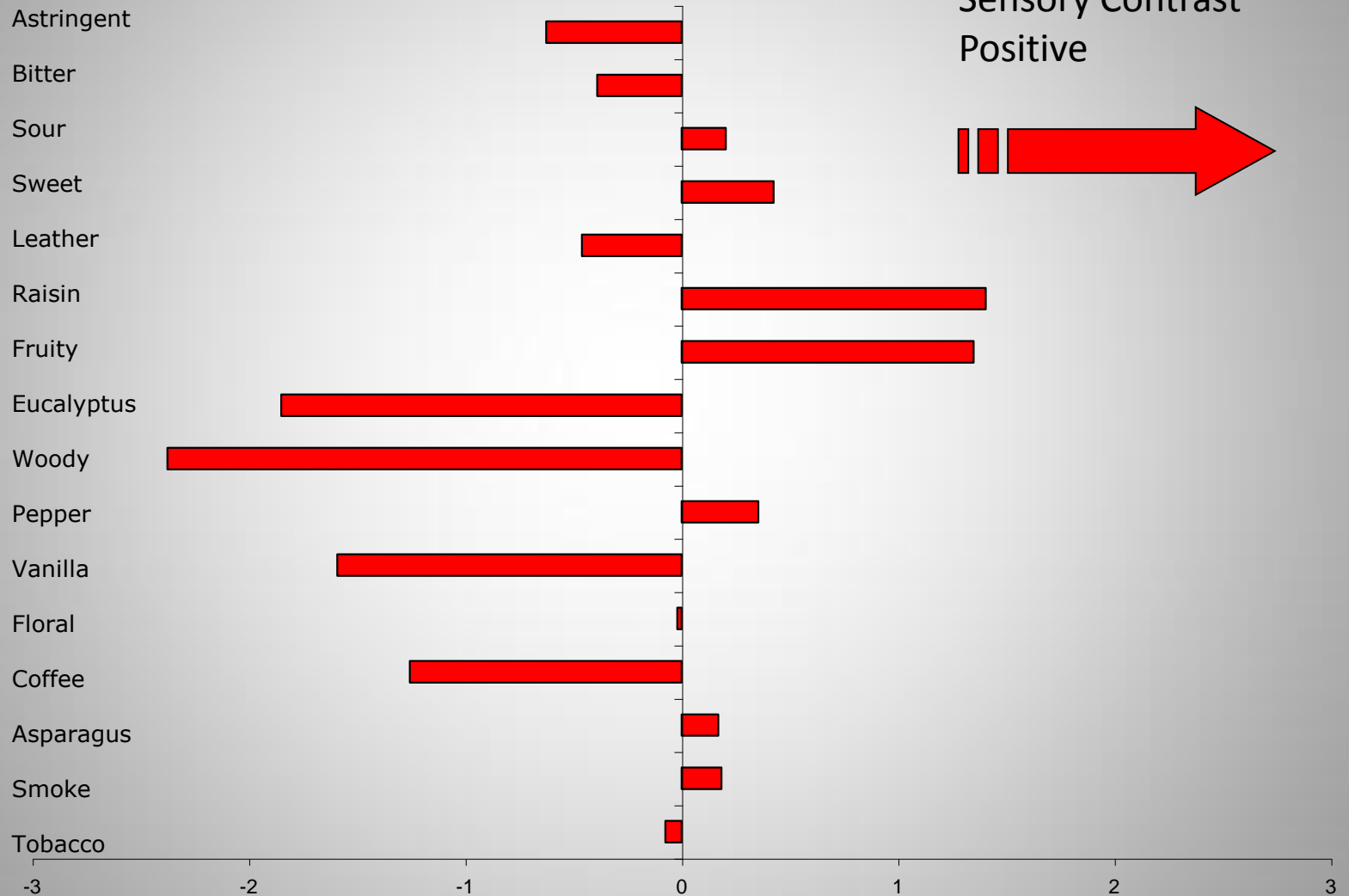
Cluster 2



Cluster 3



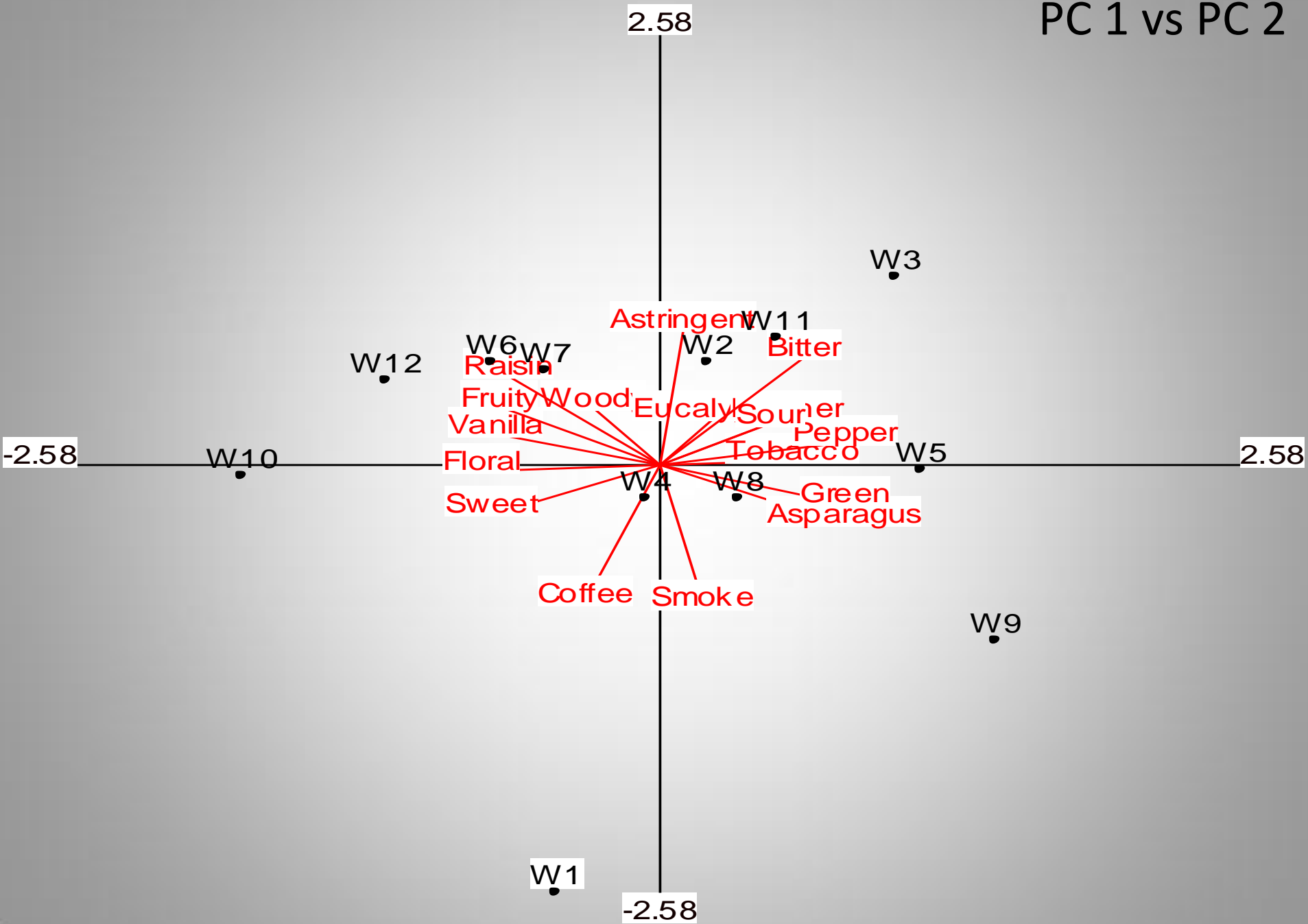
Cluster 4



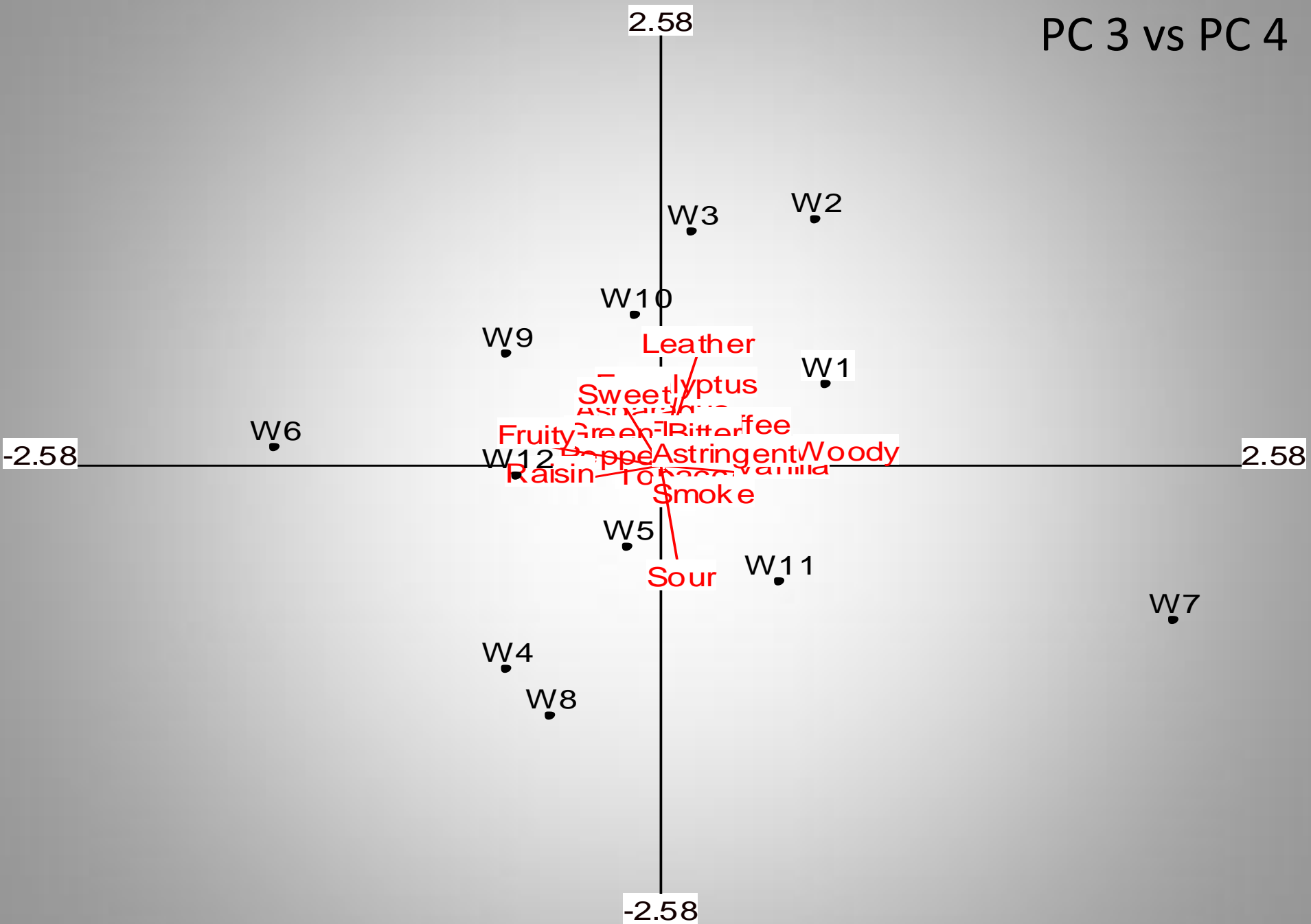
Statistical Challenge

- We need a valid approach to segmentation of consumer IB data
- Possibly a combination of sensory best practice, experimental design and advanced statistical analysis

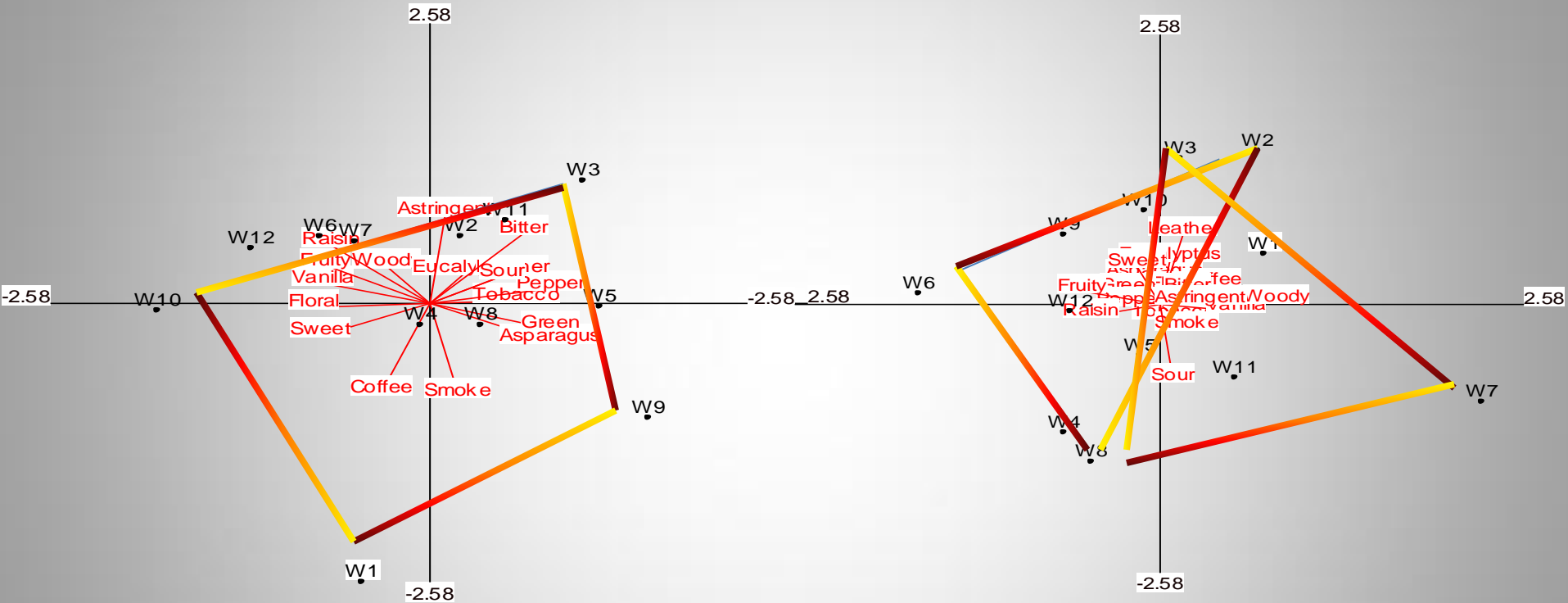
PC 1 vs PC 2



PC 3 vs PC 4



- Quadrangles and Triangles



Conclusion

- The selection of sensory contrasts may be used to strengthen the design of BIB experiments. If random incomplete blocks are chosen it is possible that groupings of quite similar products may be received by some assessors and widely different products by others.
- Prior knowledge of the sensory properties is essential in assigning blocks that will emphasize the inherent differences in the products and improve the quality of data from the study.

Segmentation of
Sensory-Informed Designed
Incomplete Block
of
Consumer Liking Data

The Bread Study

- 12 Consumer Sliced White Breads
- Calibrated Descriptive Analysis for sensory profiles
- Sensory selection of the test products
- Efficient Incomplete Blocks of 12 present 6
- A Nested experiment of 3 and 4 of 12
- 400 category consumers – 200 observations per product
- Segmentation using a model-based approach