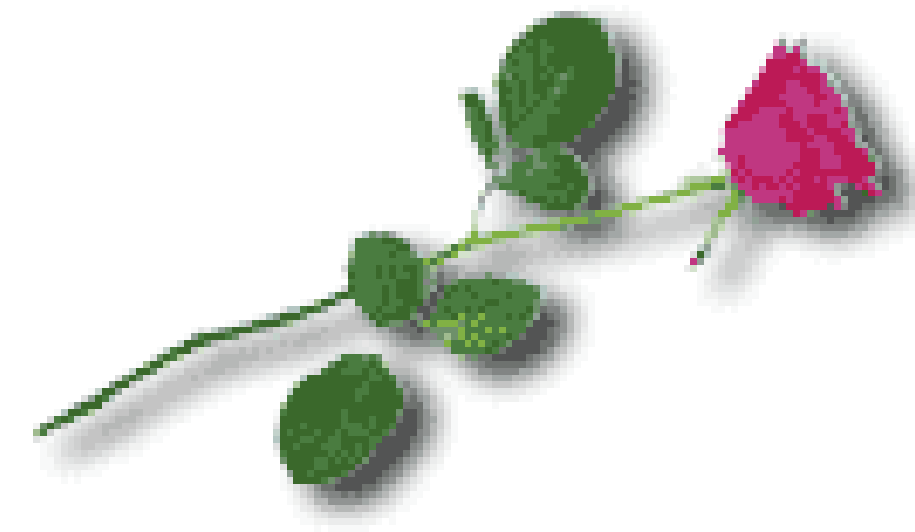
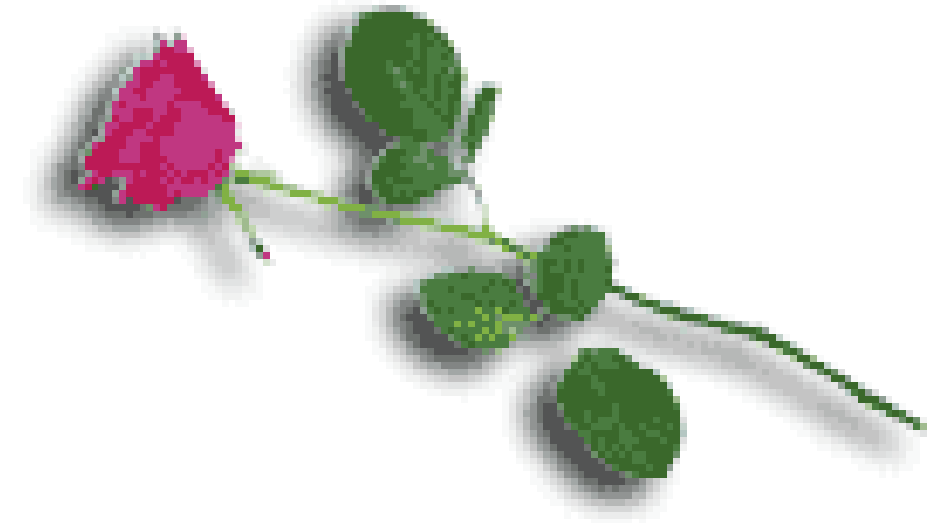


Visualizing micro and macro structures in descriptive sensory training data



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introduction

Training sessions often yield a limited dataset, which in turn restricts available analyses

Gathering ideal data sets for analysis might be at odds with imperatives of training regimen

Raw data is too voluminous to consider in numerical form

Humans have excellent ability for pattern recognition

Multifunctional graphs can reveal both macro and micro structures in the data (Tufte, 1983)

eclipse charts

Transformations important insofar as that they allow performance to be communicated visually

Inherently multivariate with easily visualized macro and micro structures

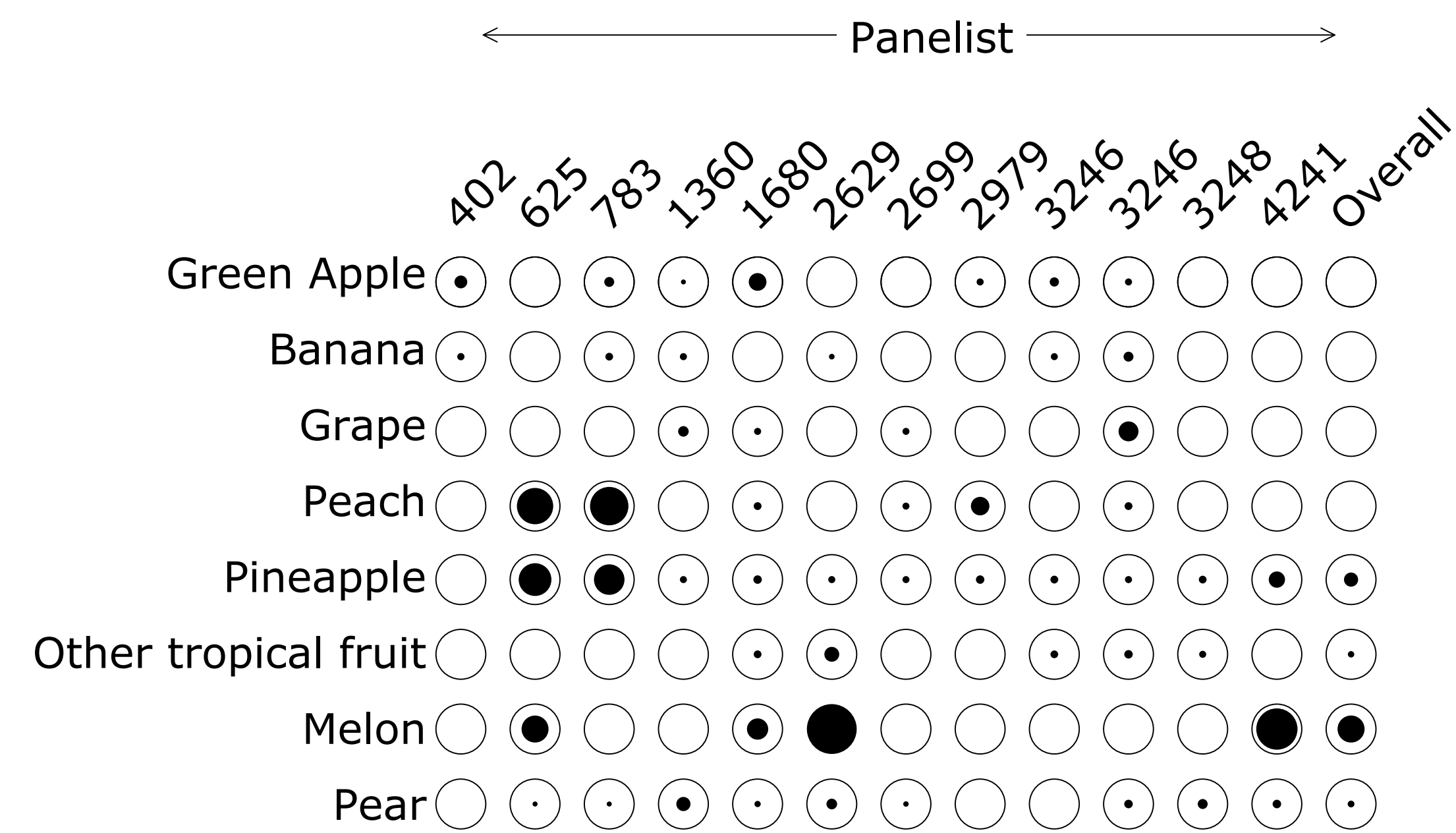
"Sun" diameter: benchmark, fixed at 1

"Moon" diameter: calculated, with penalties increasing near excellence

Interpretation

- Full sun – excellent/high
- ◐ Half eclipse – moderate
- Full eclipse – unsatisfactory/low

Fig. 1. Adjusted distance from range (calibration) for selected flavor attributes Panel T, Training Session 8



<< Interpretation is straightforward and visual

Melon flavor needs the greatest attention – in particular panelists 2629 and 4241, but also panelists 1680

Panelists 625 and 783 require reinforcement for Peach flavor and Pineapple flavor

we wanted to **communicate** panel training status effectively
we used **eclipses** to represent selected performance measures
dark spots **draw the eye** and indicate problems

materials + methods

Data from four panels considered

"Panel C" - red wine panel trained conventionally to training targets (Findlay et al., 2007)

"Panel E" - red wine panel trained using on-screen feedback to training targets only (Findlay et al., 2007)

"Panel T" - white wine panel of previously trained panelists that generated and refined their own targets using Compusense FCM® (Findlay et al., 2006)

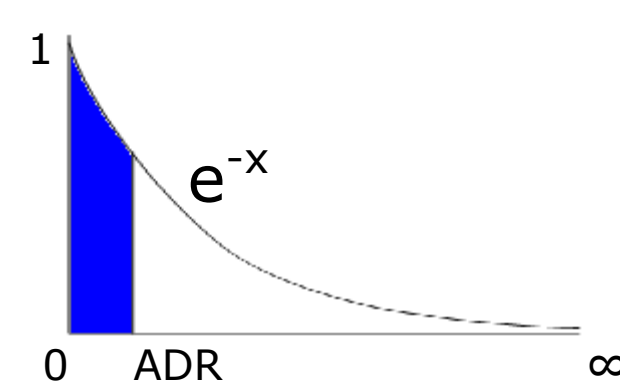
"Panel U" - white wine panel of previously untrained panelists that generated and refined their own targets using Compusense FCM® (Findlay et al., 2006)

analyses

Calibration (Figs. 1 and 2)

Two approaches following Castura, Findlay & Lesschaeve (2005)

- Hits & misses: "moon" diameter proportional to hit ratio
- Adjusted distance from range (ADR): "moon" diameter is $\int_0^{ADR} e^{-x}$



Full sun indicates all responses in range

Discrimination (Fig. 3)

Based on $p_{product}$ or other measure, e.g.: # of significant pairs quotient (Chambers & Smith, 1993)

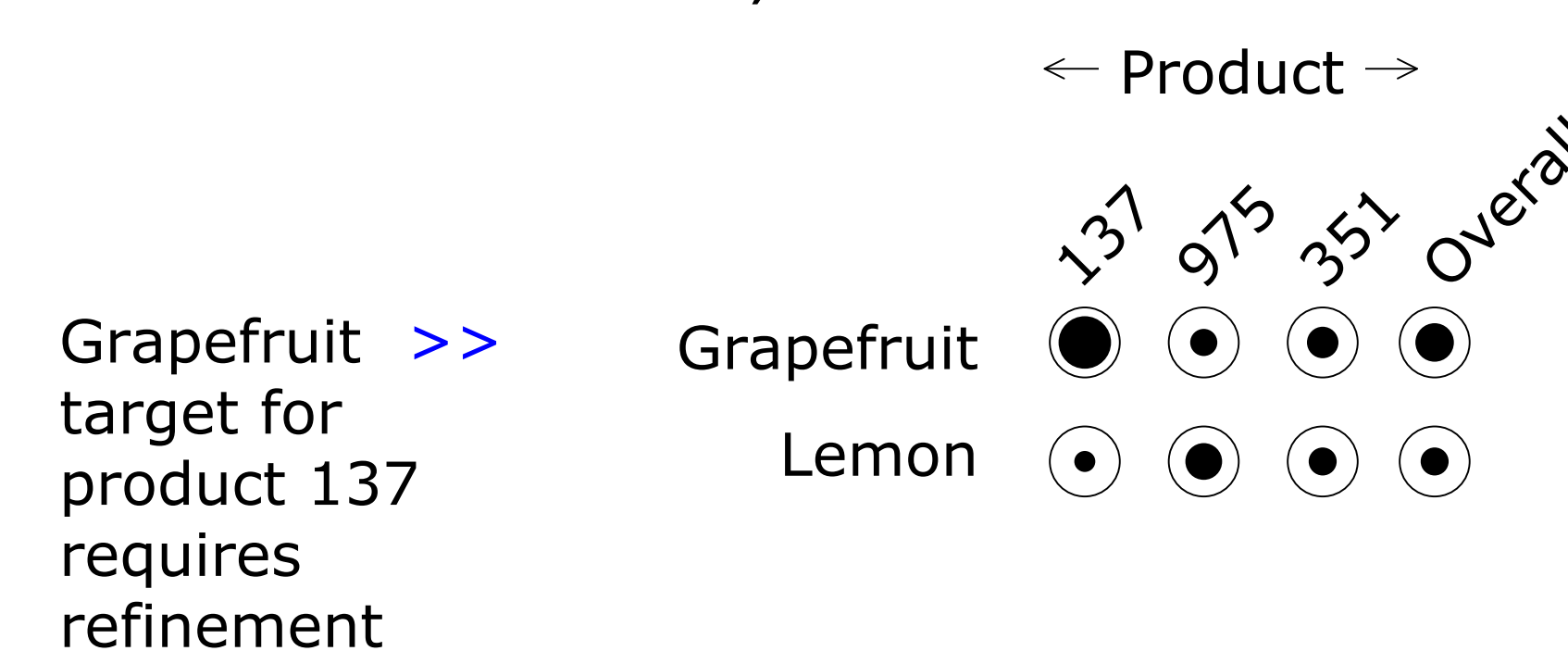
$$\text{Let "moon" diameter} = \int_0^{f(p)} e^{-x}$$

Transform $p_{product}$ for all attributes using

$$f(p) = \begin{cases} 0 & \text{when } p_{product} \leq p_{expected} \\ C(p_{product}) - p_{expected} & \text{otherwise} \end{cases}$$

We used the following parameters for all attributes: $C=2$ and $p_{expected}=0.05$

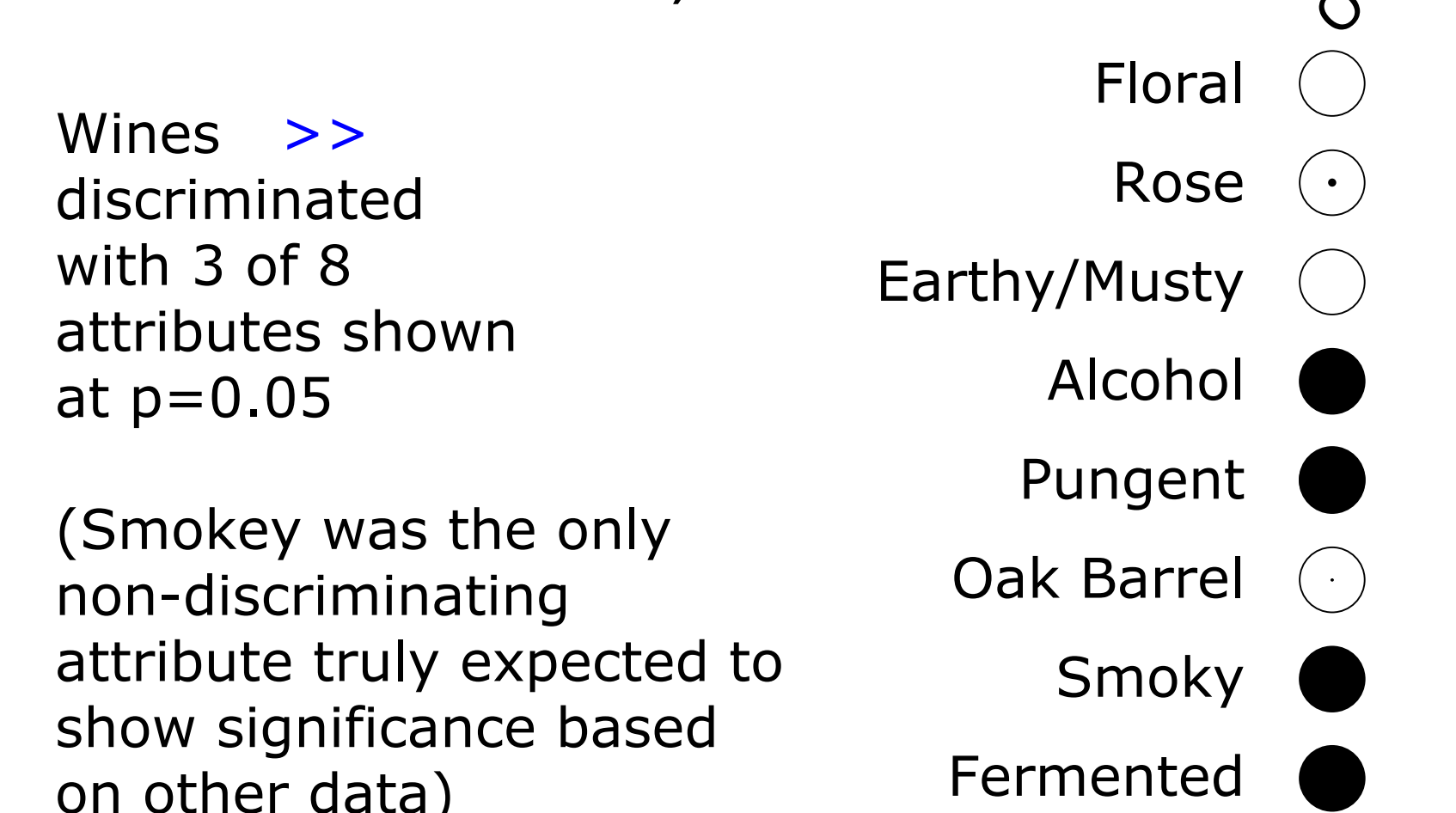
Fig. 2. Hits & misses (calibration) for selected flavor attributes, Panel U, Session 6



Target not extreme and wine did not change since target set

Appropriateness of Lemon training targets suggested because all eclipses visually similar

Fig. 3. p-value (discrimination) for selected aroma attributes, Panel E, Session 22



Wines >> discriminated with 3 of 8 attributes shown at $p=0.05$
(Smokey was the only non-discriminating attribute truly expected to show significance based on other data)

conclusions

Eclipse visualizations simplify training decisions

Panel leader gets actionable information while corrective action is possible

Similar visualizations possible for other performance measures

selected references

Castura, J.C., Findlay, C.J., & Lesschaeve, I. (2005). Monitoring calibration of descriptive sensory panels using distance from target measurements. *Food Quality and Preference*, 16(8), 682-690.

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