Building a global network of sensory panels: Evaluating the output of two sensory panels with minimal upfront alignment

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BACKGROUND AND AIMS

To conduct sensory profiling and make informed decisions for innovation projects in various food categories, Danone needs to rely not only on its own sensory panels, but also on suppliers' panels, which usually are trained on different methods and sensory language. As part of this effort to build a global network of sensory panels, Danone decided to partner with MMR in China, and leverage their Shanghai based sensory panel. This MMR Shanghai panel had been performing sensory evaluations on infant and young child formula for several years for various clients including Danone.

Aim: To understand comparability of the output of two descriptive panels in order to optimize panel alignment

METHOD – 3 STEP APPROACH:

COMPARING LEXICONS & TRAIN PANELS

- Compare standard lexicon from both panels to check on & recommend improvements for:
  - Missing attributes
  - Differences in level of detail
  - Attribute names & definitions used
  - Excessive overlap across sensory modalities
- Improvements were applied during the training sessions where possible, but both panels were **free to determine their final lexicon.**
- Both panels spent same amount on training
  (~3 sessions), resulting in a lexicon of **58 attributes** for Utrecht and **50 attributes** for Shanghai.

CONDUCT SENSORY STUDY

Following conditions were similar for both panels:

- **8-10 screened & trained panelists,** with >2 years experience as a panelist
- **5 infant/young child formulas** (Danone & competition), selected for their distinct profiles
- **40°C** serving temperature
- Daylight settings
- **Rotation scheme** (triplicate, sequential monadic, randomized per replicate, but same per panelist)

DATA ANALYSIS

- Panel performance was checked for both panels
- Multiple Factor Analysis was conducted to compare product interpretations from both panels

IN COMMON	SHANGHAI	UTRECHT
Methodology Aim for high consensus on scale use	• Achieved by comparison vs control product • Data repeatable when using same control product	• Achieved by comparing vs sour solutions • Data repeatable across projects
Control/ Dummy product • Prompt for the panel • Panel agrees on intensity score for one product	• Control product constantly available for tasting during training & profiling • Control tested blind in product set to check for noise	• Dummy product is tasted at start of each training/ profiling session, then removed • Calibrate perception, reduce first product effect
Scale Line scale 0-100 with text anchors	Control score always visible on scale	Dummy score only visible on attribute list

Results Panel performance was considered good enough for both panels

APPEARANCE, MOUTHFEEL & AFTERFEEL: HIGH AGREEMENT

- Similar directions are described by the panel, Shanghai panel has additional words for describing product directions
- Panels do not fully agree on describing Thick mouthfeel and Sticky to the cup

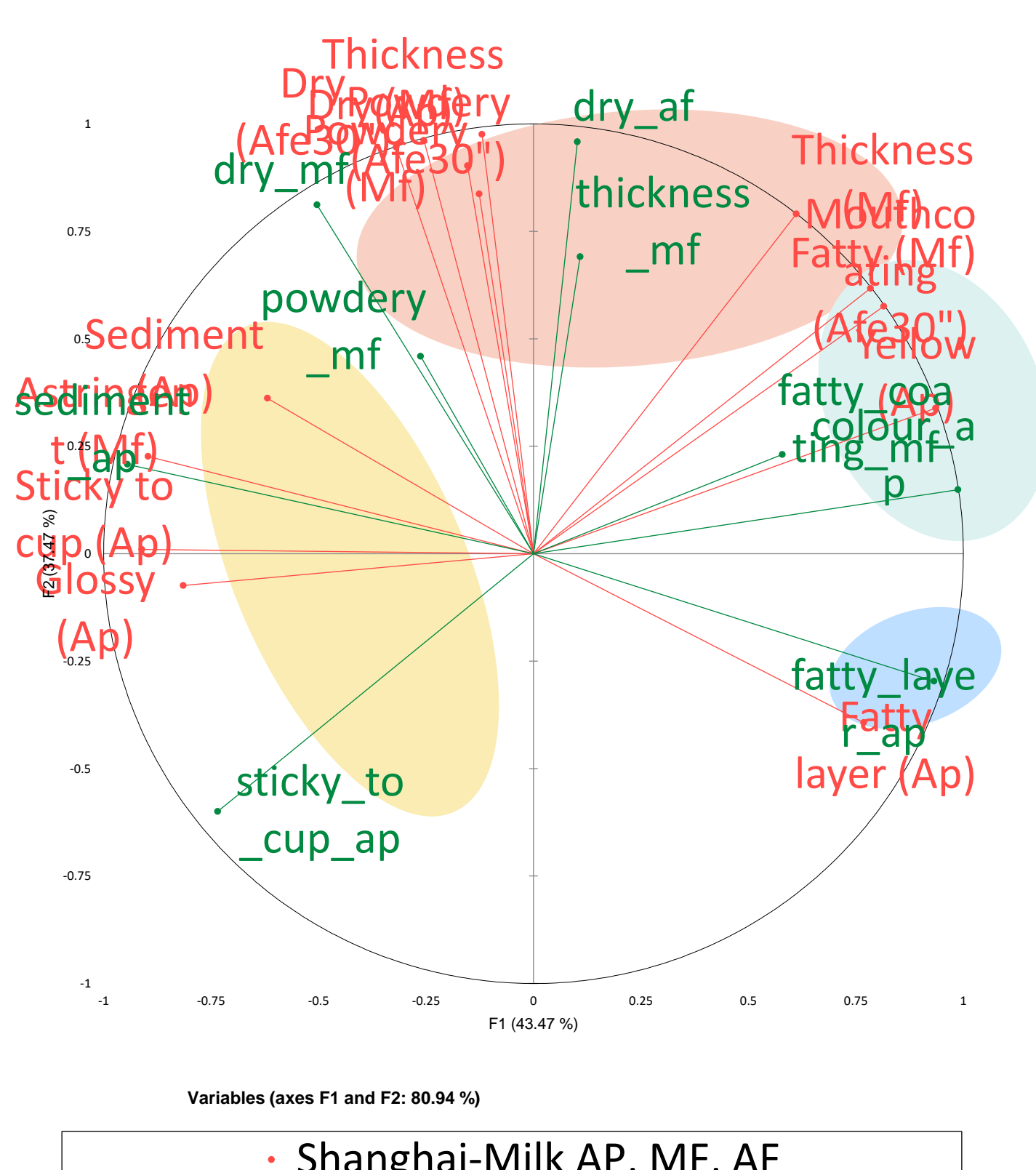### ODOUR, FLAVOUR & TASTE: AGREEMENT ON DAIRY NOTES & SOME BASIC TASTES

- There is a wide variety in off-note attributes in both lexicons
- Most off-notes are interpreted differently, biggest discrepancies found for oil, metallic & broth
- Surprisingly, Shanghai attribute for Cream is not part of the dairy cluster

Powdery (Mf)
Powdery (Af)
Thickness (Ap)
Thickness (Mf)
Dry (Mf)
Dry (Af)

Sediment (Ap)
Glossy (Ap)
Sticky to cup (Ap)
Astringent (Mf)

Colour (Ap)
Fatty (coating) (Mf)
Mouthcoating (Af)

Fatty layer (Ap)

Shanghai-Milk AP, MF, AF

CROSS-PANEL	WITHIN PANEL
Attributes aligned	Attribute direction expected
Attributes not fully aligned	Surprising attribute direction
Attributes not aligned	Conflicting attribute direction
Attribute not in lexicon	

Bitter (T/At)
Overall intensity (T/At)
Powdered rootstock (O, F)
Raw potato skin (O, F)
Sour_s/t
Savoury_fl
Cheese_s/fl
Cooked veg_s/fl
Animallic_s/fl
Metallic_fl/at
Broth (F)
Umami (BT)
Salty (BT)
Oil (F)
Rancid (O, F)

Overall intensity (O)
Savoury (O)

Sweet (O/T/At)
(Cooked) milk (O/Fl)
Butter_s/fl
Overall dairy (O/Fl)
Egg (white) (O/Fl)
Whey (S,F)
Grain_s/fl
Vanilla_s/fl

Tallowy (O/Fl)
Musty (O)
Soap (O)
Algae oil (Fl)
Cream (Fl)
Oil (O/Fl)
Fish (O/Fl/At)
Metallic (O/Fl/At)
Broth (O)

Green (O/Fl)
Rubber (O)
Overall non-dairy (O/Fl/At)
Umami (T)
Rancid (O/Fl)
Fish (O/Fl/At)
Broth (O/Fl)
Salt (T)

+ Shanghai-Milk S, FL, AT   + Utrecht-Milk S, FL, AT

CONCLUSION & NEXT STEPS

Panels comparable in evaluating appearance & mouthfeel, while odour & flavour was quite different across panels, both qualitatively & quantitively.
- Sensory language is panel & culture specific, complete alignment not possible
- However, we can fully align on attributes that both panels agree on (using same definition & references)
- Enriching sensory lexicons: try out references for 'unique' attributes in the other panel
- Ringtest valuable for understanding any cultural language differences: follow-up work planned to better understand differences in sensory to consumer language across countries