

How to define the best dynamic product experience during tasting?

#consumer #foodportion #innovation



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Context

Food sensory tests are often based on a single intake of products despite sensory experience is clearly dynamic along food portion. Some recent studies reported further development consisting in evaluating consumer's perceptions between successive intakes of a same product. In this context, **improve the consumer product experience through oriented sensory dynamic** could be possible.

Objective

Investigating hedonic dynamics of different ice-cream recipes with **variable vanilla concentration gradients** compared to the standard vanilla recipe (i.e., uniform concentration in the product). The vanilla concentration effect on intensity dynamic of sweet taste and vanilla aroma was also investigated.

Procedure

- 83 French consumers participated to 5 sessions in order to test **5 gradients**.
- Each gradient was presented by 6 successive cups / samples.
- Liking of each cup / sample was measured on a 9-point scale and Vanilla & Sweet intensities were recorded with a 5-point scale.

Results

- For each variable (liking, vanilla / sweet intensities), the following ANOVA model was conducted by cup : Variable = Gradient + Subject
- Then, a direct comparison to the gradient G1 (colored in grey) was performed in order to highlight specific deviations to this standard concentration gradient.

	Cup 1	Cup 2	Cup 3	Cup 4	Cup 5	Cup 6	Global
<i>p-values (gradient effect)</i>	0.0044	0.454	0.603	0.242	0.453	0.183	0.0975
G1	7.0	6.4	6.2	6.2	6.1	6.4	6.4
G2	6.4	6.0	6.0	6.0	6.0	6.4	6.1
G3	7.0	6.3	6.0	6.0	5.9	6.3	6.2
G4	7.0	6.0	5.9	6.1	6.1	6.1	6.2
G5	6.7	6.2	6.2	5.7	6.3	5.9	6.2

Vanilla intensity

- By cup, gradients were colored in orange (resp. green) when they were significantly less (resp. more) intense to G1 (LSD, $\alpha=5\%$).
- For G2, G4 and G5, -40% vanilla concentration led to a decrease of intensity perceived.
- Interestingly, standard concentration was perceived less intense in cup 3 for G3.
- For G5, standard vanilla concentration in cup 5 was perceived more intense.

	Cup 1	Cup 2	Cup 3	Cup 4	Cup 5	Cup 6	Global
<i>p-values (gradient effect)</i>	0.0179	0.0025	0.0019	0.0168	0.429	0.0855	0.0002
G1	3.4	3.2	3.1	3.2	3.2	3.3	3.3
G2	3.0	2.8	2.8	3.3	3.0	3.1	3.0
G3	3.3	3.0	3.3	2.9	3.1	3.0	3.1
G4	3.3	2.9	2.8	3.0	3.2	3.2	3.1
G5	3.3	2.9	3.1	3.0	3.2	3.1	3.1

The gradients

- Gradients varied by vanilla concentration: **standard, +10%, +40%, -20%, -40%**.
- These concentrations were selected based on a previous consumer test.
- Samples were coded by a 3 digit number and the gradient order presentation was balanced.



- The 5 gradients are presented in the following table:

	Cup 1	Cup 2	Cup 3	Cup 4	Cup 5	Cup 6	% Vanilla gain (full portion)
Gradient n°1	Standard	Standard	Standard	Standard	Standard	Standard	
Gradient n°2	-40%	-20%	-10%	Standard	+10%	+40%	-3.3%
Gradient n°3	+40%	+10%	Standard	-10%	-20%	-40%	-3.3%
Gradient n°4	Standard	-20%	-40%	-20%	Standard	+40%	-6.7%
Gradient n°5	Standard	-40%	Standard	-40%	Standard	-40%	-20%

The last column indicates the difference in vanilla concentration with the standard gradient over the full portion

Liking

- By cup, gradients were colored in orange when they were significantly less appreciated to G1 (LSD, $\alpha=5\%$).
- By cup, only one difference was observed: G2 was less appreciated to G1 in cup 1.
- Overall, standard gradient (G1) tended to be more appreciated to G2 and G5.

	Cup 1	Cup 2	Cup 3	Cup 4	Cup 5	Cup 6	Global
<i>p-values (gradient effect)</i>	0.0003	0.456	0.0487	0.0712	0.0101	0.419	0.449
G1	3.5	3.0	2.9	2.9	2.9	3.0	3.0
G2	3.1	2.8	2.8	2.9	2.9	3.2	2.9
G3	3.6	2.9	2.7	2.8	2.8	2.9	2.9
G4	3.5	2.8	2.6	2.8	2.8	3.0	2.9
G5	3.4	2.8	3.0	2.6	3.2	2.9	3.0

Sweet intensity

- By cup, gradients were colored in orange (resp. green) when they were significantly less (resp. more) intense to G1 (LSD, $\alpha=5\%$).
- All gradients were globally perceived less sweet compared to G1.
- Low vanilla concentrations (cup 1 to 3) for G2 were perceived less sweet.
- In cup 2, -40% to +10% vanilla concentrations were perceived less sweet.

Conclusion & Perspectives

G2 & G5 were identified as not promising since global liking were lower than G1. Interestingly, **positive sweet dynamic** was observed for G4 which could be promising for innovative product development. A perspective of this project could be to develop a new product based on G4 in order to test his global acceptance on the full portion and **validate a positive dynamic product experience**. To do that, it will be crucial to take into account **individual eating styles along food portion** (topic presented at Pangborn 2021).