

Impact of sensory multimodality congruence on olfactory perception and general perceptual comfort

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Introduction

The world is a multi-sensory environment, and every event has its multi-faces. The integration of information resulting from multisensory interaction provides us with a "common" basis for reacting to the world, making a decision about a behavior. Each sense can bring different information, creates an expectation of sensory information coming from the other sensory modality.

Cross-modal association between sensory modalities is a natural phenomenon in the perception of our environment. For a cosmetic product, touch and smell appear as the two major sensory modalities involved in product perception. Until now, few researchers have worked on this topic.

In our study, we would explore:

- 1- How the modality of touch can create an expectation of olfactory perception and vice-et-versa how a fragrance stimulus can create an expectation of a touch sensation.
- 2- How the degree of congruence or incongruence of the two modalities can influence the whole product appreciation; pleasure, comfort, want to use.... for the user.

Material & Methods

To answer these 2 questions, participants were selected to perform some tests with selected fragrances from the main olfactory notes, implemented worldwide in the cosmetics industry that are:

- Citrus
- Floral
- Fruity
- Green (aromatic)
- Spicy
- Oriental (balsamic)

But also, and with 4 different textures in line with the current cosmetics market going from a cream gel texture to a standard balm. They each followed a **4 steps methodology**, described in our full study / paper presented at IFSCC 2022.

Results & Discussion & Conclusion

Olfactory stimuli are more likely to be described with words linked to another sensory modality. Olfactory experience is the most associated with the tactile perception. Cross-modal associations between touch and smell appear to be asymmetrical.

Cross-modal congruence also showed some significant results on one of the modalities such as texture described by fragrances. 2 groups of textures were significantly identified.

The combined products could predict the overall appreciation of the products. The winning combination found could bring an advantage to the overall appreciation of the product from a customer point of view.

For Home evaluation, statistically significant correlations were shown between congruence with global appreciation of the product. Congruent products have higher scores for congruence, for want to use, for global appreciation and for valence.

It was also shown that the process of familiarization impacts the touch and smell cross-modal perception and that the surprise effect may be associated with the feeling of novelty and curiosity.

In all:

- Touch/smell congruence is a dynamic process and could be evolved during familiarization processes.
- The calming effect of cosmetic products seems mostly determined by the texture of the product whichever fragrance is combined.
- The Emotional benefits of cross-modal combined products can be further explored with longer home use and with physiological measurements [22;23].