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Commentary

Commentary on "On the contribution of the senses to food emotional experience" by Dantec et al

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A B S T R A C T

Dantec et al. argue that multisensory experience contributes more to emotion than the sum of affective contributions of individual senses: the whole is more than the sum of its parts. I will argue that we are currently lacking the measurement tools for accurate assessment of sensations and emotions over time, which makes a direct comparison virtually impossible, let alone a quantitative comparison in terms of "more" than the sum.

The authors focus on the important question how food emotions relate to individual and combined food sensations (and vice versa). Or: "how the different senses interact to create a unified affective representation of food". Like integration of food sensations into a more unified percept (e.g., taste and smell sensations tend to merge into "flavor" sensations), emotions may also integrate into a more unified percept. The authors stress that 1) emotions, just like sensations, are highly dynamical, i.e., they change over the course of a day, a meal, or even over shorter periods of time, 2) not only do sensations affect emotions but emotions affect sensations as well. Finally, the authors argue that "…….multisensory experience contributes more to emotion than the sum of affective contributions of individual senses: the whole is more than the sum of its parts". In this commentary, I will argue that we are currently lacking the measurement tools for accurate assessment of sensations and emotions over time, which makes a direct comparison virtually impossible, let alone a quantitative comparison in terms of "more" than the sum.

I believe that most people will agree that foods are highly emotional stimuli, and that the relationship between sensations and emotions is dynamical, complex and bidirectional: that piece of chocolate may elevate our sour mood, and -vice versa- that dessert may taste especially creamy when we are in a good mood. That said, I do not see how we can say anything quantitative about the relationship between the contributions of individual senses and whether emotions are more - or less - than their sum, because we are lacking basic measurement tools. The authors refer to neurophysiological studies where brain activations to complex sensations are more/different than activations to their components. I wonder, however, whether activation patterns can be linked sufficiently to what people perceive and feel to conclude something quantitatively. Moreover, brain activation patterns are probably not well-suited to reflect the temporal changes of emotions during a meal, let alone during a single bite. Alternative methods can be roughly divided into methods that measure emotions either explicitly, such as Temporal Dominance of Emotions (TDE) or implicitly, such as autonomic nervous system activity, or facial expressions (even if one may argue that facial expressions are not implicit). An example of TDE for chocolate is shown in Fig. 1, together with a TDS (Temporal Dominance of Sensation) result for the same food. The TDE result shows a gradual shift of emotions over the course of one bite whereby dominant emotions such as interest make way to dominant emotions such as calm and ultimately of boredom. Even-though this method only reflects the emotion that is dominant at any given moment, it must be kept in mind that other emotions may be present as well at the same moment. Even faster changes in emotions can be found in facial expressions. TDS results for the same foods also show dominant sensations that gradually change from crunchy texture to cocoa flavor but there the (apparent) overlap with the corresponding TDE stops. The TDS and TDE results suggest rather slow changes over time in emotions and sensations. Most likely, these slow changes reflect limitations of the response method rather than limitations of the perceptual/emotional system. Tracing one's emotions and sensations over time and converting them into numbers is not easy and is time-consuming. When responses are no longer given explicitly, but measured implicitly, for example with facial expressions, a different picture emerges. Fig. 2 shows facial expressions to a sip of a breakfast drink. We see rapid changes in emotional expressions within the course of only 10 s, whereby expressions of surprise make way for other expressions within seconds. For sensations, we lack similar implicit methods which makes it virtually impossible to relate sensations directly to emotions. Even if we would have the proper methods, it may still not be enough to verify the authors' statement regarding the relation

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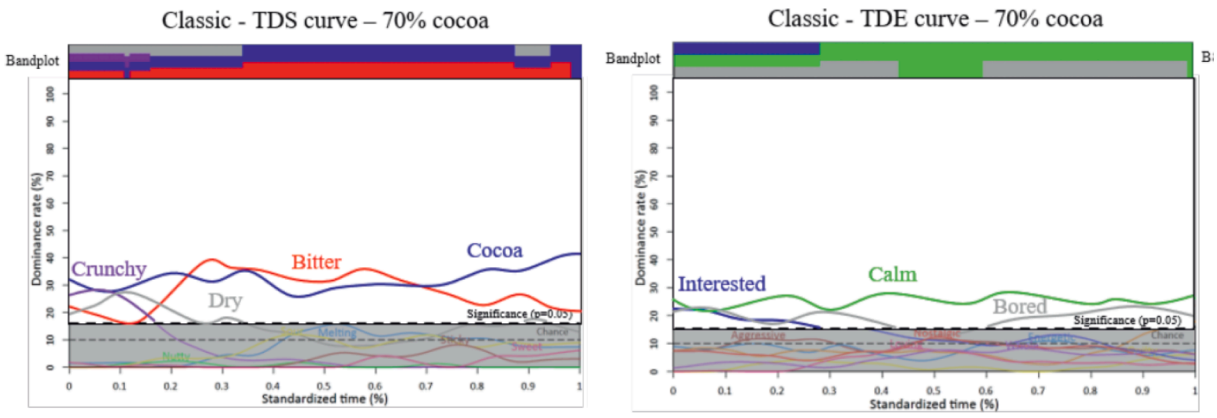

Fig. 1. Examples of Temporal Dominance of Sensations (or TDS, left figure) and Temporal Dominance of Emotions (or TDE, right figure) for chocolate. Results from van Bommel et al. Food Quality and Preference,71,332–342, 2019.

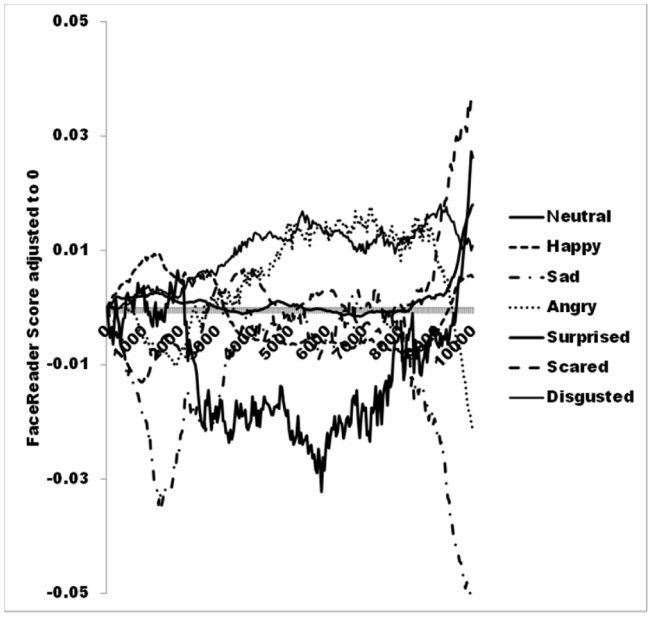

Fig. 2. Facial expressions during 10 s in response to a sip of a breakfast drink. Results are averaged across participants. Unpublished results from de Wijk et al.

between emotions and sensations.

To demonstrate that emotions are more than the sum of the (emotional) components one has to demonstrate that 1) at any given moment there is a systematic relation between specific sensations and specific emotions, 2) sensations have equal weights and contribute in a systematic way to emotions, and 3) the resulting emotion (s) is "more" (pronounced, intense?) than the sum of the sensations. Intuitively, I agree with point 1), i.e., emotions are systematically related to sensations. Regarding the other two points, I have my doubts. I believe that some sensations may be more important for emotions than others. A singly grain of sand in an otherwise creamy and delicious dessert may ruin the experience completely. This suggests that the sensation of graininess in the context of desserts is more important for emotions than other sensations such as thickness, aroma, or creaminess (even though this may not be true for everybody) . Also, it is clear from this example that the resulting emotions are not based on a simple rule such as the additivity of sensations. Instead, I can imagine that contributions of sensations to emotions are non-linear. Some, less critical, sensations may only marginally contribute to emotions, almost irrespective of the sensation's intensity. Other, more critical sensations, may either enhance or decrease an emotion, depending on their intensities. Or, they may change the nature of the emotion all together: the grain of salt may not just reduce the soothing emotion associated with a delicious creamy dessert, it may completely destroy it, and replace it by a completely different more negative emotion, such as disappointment, anger, or fear (for the dental implications of sand…….).

In conclusion, I argue that we are currently lacking the tools to systematically relate sensations to emotions and to verify statements like "……multisensory experience contributes more to emotion than the sum of affective contributions of individual senses: the whole is more than the sum of its parts".