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# Temporal Dominance of Motions: a new concept to enlighten the links between texture perceptions and oral processing

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Texture perception is a multidimensional and dynamic phenomenon. Consumers adapt their oral strategy to the bolus properties throughout sequences of motions that depend (i) on the degree of breakdown required by food, but also (ii) on individual preferences in terms of in-mouth behavior.

However, the links between motions and texture perceptions during oral processing still remain only partially identified. Understanding these links is critical to better account for the physiological characteristics of consumers in the design of foods, in particular for specific populations (infants, elderly, or patients with dysphagia). For this purpose, a method entitled "Temporal Dominance of Motions" (TDM) was developed. Drawn from "Temporal Dominance of Sensations" (TDS), TDM is based on the real-time description of the sequences of in-mouth motions and elementary physiological actions during oral processing. 16 trained panelists were asked to describe 12 food gels (including commercial and laboratory samples) with the use of TDM, TDS, and sequential sensory profiling methods. The data were then analysed to identify the main oral actions at the origin of the texture perceptions of these gels.

The results report a wide variety of TDM and TDS patterns throughout the different gels. In spite of an important diversity of oral behaviors reported among the panelists, different steps of consensus have also been identified between in-mouth actions and texture perceptions. At early stage of oral processing, depending on the mechanical properties of the gels, tongue or molar actions are involved, leading respectively to the evaluation of firmness or moistness, or to friability or brittleness. Just before swallowing, sticky and grainy boli were shown to require more frequently the use of tongue and cheeks, as well as the incorporation of saliva.

This study demonstrates the potential interest of this newly built TDM methodology as an original tool to better understand the different dynamic mechanisms involved in texture perceptions.