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Integration of smell and taste: EEG study of brain mechanisms allowing the enhancement of saltiness with aroma

Charlotte Sinding, Henri Thibault, Thierry Thomas-Danguin

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P1.44 Vision dominates audition in adults but not children: Adults have a lower threshold for the McGurk effect in audio-visual noise

*Hirst, R.J., Stacey, J., Cragg, L., Stacey, P.C. & Allen, H.A.
University of Nottingham*

Across development, humans show an increasing reliance upon vision, such that vision increasingly drives audio-visual perception. This is evidenced in illusions such as the McGurk effect, in which a seen mouth movement changes the perceived sound. The current paper assesses the effects of manipulating the heard and seen signal by adding auditory and visual noise to McGurk stimuli in children aged 3 to 12 years (n=90) and adults aged 20 to 35 years (n=32). Auditory noise increased the likelihood of vision changing auditory perception. Visual noise reduced the likelihood of vision changing auditory perception. Based upon a proposed developmental shift from auditory to visual dominance we predicted that children would be less susceptible to the McGurk effect, and that adults would show the effect in higher levels of visual noise and with less auditory noise compared with children. We found that susceptibility to the McGurk effect increased with development and was higher in adults than children. Children required more auditory noise than adults to induce McGurk responses and less visual noise to reduce McGurk responses (i.e. adults and older children were more easily influenced by vision). Reduced susceptibility in childhood supports the theory that sensory dominance shifts across development.

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P1.45 Integration of smell and taste: EEG study of brain mechanisms allowing the enhancement of saltiness with aroma

*Sinding, C., Thibault, H. & Thomas-Danguin T.
Centre des Sciences du Goût et de l'Alimentation, AgroSup Dijon, CNRS,
INRA, Université Bourgogne Franche-Comté, F-21000 Dijon, France.*

Odors have the natural property to induce a taste (odor-induced taste enhancement, OITE). Yet odors and taste are perceived through independent senses, which never interact but in the brain. OITE processes are mostly unconscious, but decisive in the pleasure of food. Taste and Smell may interact at different levels of the integration process. The main theory is that the configural pattern of activation is stored in high integration

cortices or memory areas and needs to be reactivated in order to induce taste perception, through top-down processes. However, latest findings in rats, showed that early connections between gustatory and olfactory cortices enabled the activation of secondary olfactory cortex (piriform cortex), when rats were stimulated with sugar solution. We wanted here to test these hypotheses in human. We examined the brain chronometry of taste and smell integration with a simple 5 electrodes EEG system, in association with a high time resolution gustometer. We used close to real products, a green-pea soup, two levels of salt “usual” and “reduced” (-25% salt), and an aroma “beef stock”. The idea was to compare the soup usually salted (S.usu), and the soup with a reduced level of salt (S.red), with the soup containing a reduced level of salt but a beef stock aroma (S.red.A). The stimulation consisted in 60µl of one solution sprayed as a thin drizzle on the tongue during 400ms (repeated 40 times interleaved by 16 to 20 s water stimulations). As a result, we identified two late pics, N2 and P3, which appeared only in the salty solutions and not in the controls (soup alone and soup with aroma). The differential amplitude N2P3 and for the S.red.A solution was higher as compared to the S.red. Finally the latency of N2P3 was higher for S.red.A solution as compared to S.usu. As the effects are found in late components of the event related potential, these results seem to confirm the main theory, that aroma may affect taste through the activation of the flavor memory in high integration cortices.

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P1.46 Shapes associated with emotion can influence product taste expectations

*Orejarena, M.C., Salgado-Montejo, A., Salgado, R., Betancur, M.I., Velasco, C., Salgado, C.J. & Spence, C.
Universidad de La Sabana, Center for Multisensory Marketing BI Norwegian Business School, Neurosketch Colombia, Crossmodal Research Lab
University of Oxford*

In recent years, there has been a steady interest in unearthing the relation between visual features with both an emotional valence and gustatory tastes. Different studies have demonstrated that visual features such as roundness/angularity, symmetry/asymmetry, and the number of elements can be associated with both an emotional valence and basic tastes (sweet or sour). There is increasing evidence that simple geometric shapes that resemble facial features can be associated with a valence and with an emotion. What is more, there is research showing that experiencing a gustatory taste is generally accompanied by a facial expression. However, there are no studies that have probed as to whether geometric shapes that resemble facial expressions of taste can be matched to basic tastes. This