The Language of Facial Expressions: A Neuroimaging Study on How a Smile Is Generated and Perceived by Another Person

Shteyman, Amy (School: John L. Miller Great Neck North High School)

Facial expressions, particularly smiles, have implications for debilitating psychiatric disorders such as autism, depression, and schizophrenia, which make them a critical area for study. As of yet, no study has measured the neural activity during the simultaneous expression and reception of facial cues between people. The purpose of this experiment is to measure and compare the brain activity between subjects smiling and other subjects reacting to the smiles. The non-invasive device functional near-infrared spectroscopy (fNIRS) allows for measurement of brain activity during face-to-face interactions. Subjects were paired, fNIRS optodes were placed on their heads, and facial tracking devices detected smiles. Participants alternated between watching ‘cute’ animal videos (the video watchers) and observing the faces of their partners (the face watchers). Results show that even when both partners smiled (a smile contagion) there was different neurological activity distinguishing a social smile generated by looking at the face of a partner from that of a smile generated in response to a non-human stimulus. A contagion smile activated the social areas of the brain such as the language and frontal areas, while non-social smiles activated the motor and parietal cortices. These findings advance our understanding of neural systems specialized for social behaviors.

Awards Won:
Intel ISEF Best of Category Award of $5,000
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