Scientific Article

Title

The Motor Basis for Misophonia

Language: EN

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Abstract

Misophonia is a common disorder characterized by the experience of strong negative emotions of anger and anxiety in response to certain everyday sounds, such as those generated by other people eating, drinking, and breathing. The commonplace nature of these "trigger" sounds makes misophonia a devastating disorder for sufferers and their families. How such innocuous sounds trigger this response is unknown. Since most trigger sounds are generated by orofacial movements (e.g., chewing) in others, we hypothesized that the mirror neuron system related to orofacial movements could underlie misophonia. We analyzed resting state fMRI (rs-fMRI) connectivity (N = 33, 16 females) and sound-evoked fMRI responses (N = 42, 29 females) in misophonia sufferers and controls. We demonstrate that, compared with controls, the misophonia group show no difference in auditory cortex responses to trigger sounds, but do show: (1) stronger rs-fMRI connectivity between both auditory and visual cortex and the ventral premotor cortex responsible for orofacial movements; (2) stronger functional connectivity between the auditory cortex and orofacial motor area during sound perception in general; and (3) stronger activation of the orofacial motor area, specifically, in response to trigger sounds. Our results support a model of misophonia based on "hyper-mirroring" of the orofacial actions of others with sounds being the "medium" via which action of others is excessively mirrored. Misophonia is therefore not an abreaction to sounds, per se, but a manifestation of activity in parts of the motor system involved in producing those sounds. This new framework to understand misophonia can explain behavioral and emotional responses and has important consequences for devising effective therapies.

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