

CBS - RCLCN Research Seminar

Neuroplasticity of individuals with congenital amusia: An intervention study

Presented by

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All are welcome.

ABSTRACT

Amusia is a lifelong neurogenetic disorder of refined pitch processing without brain injury. It inflicts a wide range of behavioral symptoms, including poor musical pitch perception as well as degraded intonation and emotional prosody perception in speech. In tonal languages like Hong Kong Cantonese (HKC), amusia further leads to impairment in lexical tone perception. Although the behavioral symptoms of amusia are well described, far less is known about the neuroplasticity of the amusical brain. Intervention studies on amusia have been scarce, and the few existing studies reported null or very limited effects, leading researchers to suggest that the amusical brain has limited plasticity. Nonetheless, the limited intervention effect may be partly due to the suboptimal intervention strategy. To re-examine this issue, we designed and administered novel melody discrimination training with small pitch deviations to a group of HKC speakers with congenital amusia. The melody was presented with simultaneous visual cues (a sequence of short lines varying in spatial height that matches pitch height of the melodic notes) with the aim to help amusics to form and consolidate a visual-spatial representation of pitch patterns. Amusics showed significant improvement in musical perception after training as assessed by the Montreal Battery of Evaluation of Amusia (MBEA), a standardized test used to diagnose amusia; more than half of the amusics arose above the cutoff score for amusia. Their improvement also transferred to the speech domain, eliciting simultaneous improvement in lexical tone perception. We observed some evidence of neural changes, with the rebound of P300 amplitude in amusics in some conditions, which has been reported to be a primary neural landmark of the pitch deficits of amusia. These results are among the first to provide neural evidence for the plasticity of the amusical brain.

Language, Cognition, and Neuroscience