

Perception of word stress by German congenital amusics

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Congenital amusia negatively influences the perception of musical pitch and rhythm (Peretz et al. 2002) and is not caused by a hearing deficiency, brain damage or intellectual impairment. It has been shown that amusics also have impaired perception of intonation (Patel et al. 2008) and linguistic tones (Tillmann et al. 2011). In the present study we investigated whether congenital amusia also negatively impacts the perception of word stress.

For this, we used the German minimal stress pair 'umstellen 'to reposition' vs. um'stellen 'to enclose', and systematically manipulated the stress cues of pitch, intensity, duration and spectral tilt. We assessed amusics' behavioral and electrophysiological responses (Mismatch negativity: MMN) in two separate experiments with 11 congenital amusics and 11 matched controls.

In the behavioral study, the stimuli were presented in isolation via headphones, and participants had to indicate the meaning by clicking on one of two pictures. A generalized linear model of the replies showed that amusics performed worse than controls, and that only duration and pitch had a significant influence on the perception of stress.

Based on these results, we selected the stimuli for the EEG study. These stimuli were presented in a multi-deviant oddball paradigm in 4 blocks. In each block, one stimulus was the standard and occurred 85% of the time, while the three other stimuli served as deviants, resulting in 16 event-related potentials (ERPs) per participant. The results of this study revealed that both amusics and controls showed MMNs but that amusics had a significantly smaller MMN than controls.

We conclude that congenital amusia affects the linguistic perception of pitch and duration, therefore having more far-reaching consequences for speech perception than previously assumed. Not only was the behavior of amusics shown to be affected, we also showed differences in the MMN, reflecting differences in early auditory change detection.

References: • Patel, A. et al. 2008. Speech intonation perception deficits in musical tone deafness. *Music Perception* 25(4). 357–368 • Peretz, I. et al. 2002. Congenital amusia: A disorder of fine-grained pitch discrimination. *Neuron* 33(2), 185–191. • Tillmann, B. et al. 2011. Congenital Amusia interferes with pitch processing in tone languages. *Frontiers in Psychology* 2.