Accepted Manuscript

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PII: S0378-5955(18)30102-3

DOI: 10.1016/j.heares.2018.07.001

Reference: HEARES 7589

To appear in: *Hearing Research*

Received Date: 9 March 2018

Revised Date: 22 June 2018

Accepted Date: 2 July 2018

Please cite this article as: Jagoda, L., Giroud, N., Neff, P., Kegel, A., Kleinjung, T., Meyer, M., Speech Perception in Tinnitus is Related to Individual Distress Level - a Neurophysiological Study, *Hearing Research* (2018), doi: 10.1016/j.heares.2018.07.001.

Speech Perception in Tinnitus is Related to Individual Distress Level - a Neurophysiological Study

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Abstract

Individuals suffering from tinnitus often complain about difficulties understanding speech in noisy environments even in the absence of a peripheral hearing loss. This EEG study aimed to investigate whether aspects of phonetic perception are affected by the experience of tinnitus. We examined a sample of individuals with chronic, subjective tinnitus (n=30, age range 30-50 yrs.), who underwent behavioural screening (standard tinnitus questionnaires) and comprehensive audiometric testing that covered peripheral and central hearing abilities (pure tone audiometry, suprathreshold audiometry (frequency selectivity and temporal compression), and speech in noise performance). In addition, participants performed a phoneme discrimination task embedded in an active oddball paradigm, while auditory evoked potentials (AEPs) were recorded. In particular, we aimed to investigate if reported speech difficulties in chronic tinnitus trace back to deficits in more elementary speech processes such as phonetic processing. Furthermore, we explored whether central hearing loss and tinnitus' psychometric profile may account for deficiencies in speech perception.

The analysis of behavioural and audiometric data showed indications of mild to moderate symptoms of tinnitus distress when peripheral hearing loss was not in evidence. Nevertheless, tinnitus distress was negatively related to speech in noise performance which may be indicative of a lack of inhibitory competence. We further observed an effect of tinnitus distress on phoneme discrimination. More precisely, higher tinnitus distress was associated with higher accuracy and longer reaction times, while the effect on reaction times was mediated by the individual N2 ERP peak amplitudes. Our results suggest that tinnitus clearly interacts with the central auditory system in that responsiveness to salient input changes as a function of tinnitus-related distress, irrespective of peripheral hearing loss. Akin to individuals with higher psychological stress, persons with