

**The speech-to-song illusion in frontotemporal dementia and Alzheimer's disease**

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Perceptual plasticity depends on dynamic, coordinated synaptic tuning across neural circuits and is therefore likely to be vulnerable to neurodegenerative pathologies. However, the nature and limits of perceptual plasticity in dementia are largely unknown. We addressed this issue using a dramatic instance of auditory perceptual plasticity - the speech-to-song illusion discovered by Diana Deutsch\*, whereby a spoken phrase is perceived as sung after a few repetitions. We studied patients representing all major syndromes of frontotemporal dementia (FTD) (N=17) and Alzheimer's disease (AD) (N=24) versus healthy age-matched controls (N=24). We asked each participant whether they experienced the Deutsch illusion and separately assessed their ability to discriminate spoken and sung phrases. In patients who reported experiencing the illusion, we verified this using a forced-choice procedure. The Deutsch illusion was reported by 79% of healthy controls, and 60% of patients with semantic dementia (SD), 37.5% with progressive non-fluent aphasia (PNFA), 21% with typical AD, 20% with logopenic aphasia (LPA), and none with behavioural variant FTD (bvFTD). Mean scores for speech/song discrimination were as follows: healthy controls, 99%; SD, 98%, AD and LPA, 95%; PNFA, 93%; bvFTD, 83%. bvFTD performed significantly lower than healthy controls at discrimination. Perception of the speech-to-song illusion is reduced in canonical FTD and AD syndromes compared with healthy older people and stratifies dementia syndromes disproportionately to any underlying perceptual deficit. The illusion presents an interesting new model for assessing perceptual plasticity in these diseases.

\*Deutsch, D. et al. (2011) Illusory transformation from speech to song. *J. Acoust. Soc. Am.*

**Conflicts of interest**

N/A