Collecting large data sets of psychophysical tuning curves through consumer mobile applications

Vinzenz Schönfelder[1], Tina Baumann[1]

[1]Mimi Hearing Technologies GmbH, Berlin

Psychophysical tuning curves (PTCs) serve to quantify a person's spectral tuning capacity, a central property of human auditory perception. Compared to an audiogram, PTCs allow a more fine grained diagnosis of hearing problems and directly relate to difficulties universally encountered in common listening situations which cannot be explained merely by elevated thresholds (Hopkins & Moore, 2011).

Sęk & Moore (2011) have proposed the fastPTC method for efficient and reliable PTC testing of naive users. We have slightly adapted that method, implemented and deployed it as an automated consumer hearing test. Being based on web-technology, it can run on practically any internet-connected device and is provided as a free application on standard mobile platforms. A single test can be completed within about 3 minutes, while both ears can be tested across a frequency range from 500-4kHz within less than 30 minutes.

User data has been collected for a continuous period of more than 6 months. So far, we have obtained several thousand PTCs. For about a quarter of those datasets, we also obtained audiometric thresholds.

We discuss challenges encountered while translating an advanced hearing test from an academic into a consumer context as well as advantages and disadvantages of collecting scientific data through a consumer tool. We show early results of a large-scale investigation into the relationship between individual PTCs and hearing thresholds. We conclude with a discussion of the potential purposes of obtaining PTCs for hearing diagnostics.

—

Sęk, A., & Moore, B. C. J. (2011). Implementation of a fast method for measuring psychophysical tuning curves. Int J Audiol, 50(4), 237–242.

Hopkins, K., & Moore, B. C. J. (2011). The effects of age and cochlear hearing loss on temporal fine structure sensitivity, frequency selectivity, and speech reception in noise. J Acoust Soc Am, 130(1), 334–349.