Speaker age estimation by musicians and nonmusicians

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Speaker age is one of the most widely researched human attributes in the context of social perception based on the speaker's voice. Research in this field started in the 1960s and, although some differences were found, the first findings of Hollien and Shipp in 1969 (cited by Huntley, Hollien and Shipp, 1987), have been generally confirmed by many others stating that listeners judge younger adults older than their actual age, while older speakers are usually believed to be younger than their calendar age (e.g. Hughes and Rhodes, 2010; Skoog Waller et al., 2012). Speaker age estimation is not only a function of the speaker's voice parameters. Huntley, Hollien and Shipp (1987) proposed that in addition to individual differences between speakers, some listener attributes seem to influence age judgments, such as the listener's own age. A review by Moyse (2014) also concluded that younger listeners are more accurate than the older ones, and, some gender differences were also found, with women being more accurate in age judgments.

The main focus of this presentation is another aspect that may differentiate listeners in speaker age estimation. In the past decade, there has been an increasing interest in researching differences in sound perception abilities that exist between musicians and non-musicians. Patel's expanded OPERA hypothesis (O = overlap between neural networks processing speech and music, P = higher precision of processing is demanded when music is heard, E = emotion, R = repetition of musical activities, A = focused attention demanded by music), published in 2014, proposes that when music and speech share auditory perceptual mechanisms, and music places higher demands on those auditory mechanisms than speech does, speech processing may be enhanced in musicians (Patel, 2014). Research results have proven that musicians are better at pitch perception (Alexander, Wong and Bradlow, 2005), frequency discrimination (Barrett et al., 2013), voice timbre processing (Chartrand–Belin, 2006) and in other aspects of auditory processing related to speech perception.

Differences in the perception of nonverbal contents of speech by musicians and non-musicians are, however, still largely unknown. To the best knowledge of the author, it is only the perception of emotions that has been researched in this respect, verifying a robust difference between the two groups, musicians being significantly better at identifying emotions from speech (Lima–São Luís, 2011).

The proposed presentation attempts to find similar differences in speaker age estimation. It is hypothesized that musicians' age estimations are more accurate than that of non-musicians, and musicians' age estimations are more coherent, i.e. individual differences in age estimations are smaller than in the non-musician's group. For the experiments, 24 spontaneous speech samples (males, 20-73 years of age) selected from the BEA database (Gósy, 2011) are used as acoustic stimuli. One group of subjects comprises students of music with at least 8 years of classical music training (i.e. playing an instrument), and the other group consists of students of other fields with no previous musical training at any level. After listening to each sound sample, subjects are asked to estimate the age of the speaker in years.

Since listening experiments are in process at the time of abstract submission, only preliminary results are available, mainly because of the limited number of non-musician subjects included so far. Preliminary results with 38 musicians and 11 non-musicians do not support that the musician subjects' age estimations differ significantly from those of non-musicians, however, in most of the cases – but not always –, boxplots representing the musicians' age estimations present narrower ranges than those of non-musicians. If results with the inclusion of more non-musicians remain the same, it will suggest that musical expertise does not necessarily improve age estimations in general, however, may help avoid "extreme" estimations. Another aspect of the phenomenon, i.e. the possible role of f0 and speech rate in age estimation in both groups is also discussed.

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