

9.1: (10:40 – 11:00)

**Purely vocal tone-deafness: The case of A.Z.**

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The ability to sing is quite widespread in the general population. Most people without musical training find it particularly pleasurable to sing in a group (e.g. in a nonprofessional choir or during religious practices). The majority of occasional singers can sing in tune and in time, provided that they perform at a slow tempo. Yet, not everybody can sing proficiently. For example, self-declared tone-deaf individuals often complain of being unable to sing. Poor singing in tone-deaf individuals has often been treated as the result of an impoverished perceptual system. Nevertheless, recent evidence indicates that tone-deafness can occur in a purely vocal form, with spared perception. In this study we examined this purely vocal form of tone-deafness in A.Z., a recently discovered tone-deaf patient. A.Z. is a 20-year-old psychology student without musical training. Singing proficiency was assessed by asking A.Z. and a group of 5 matched controls to repeat single pitches (Task 1), intervals (Task 2), and short melodies (Task 3); in addition, participants had to sing three well-known melodies (e.g. Jingle Bells) at a natural tempo (Task 4) and at a fixed slow tempo (Task 5). Each performance was analyzed with an acoustically-based method yielding objective measures of pitch and time accuracy such as the number of pitch and time errors. In all tasks, A.Z. exhibited impaired pitch accuracy (e.g. a larger number of pitch errors) as compared to controls. However, A.Z. performances were not impaired with regard to the time dimension. A.Z.'s perceptual abilities were within normal range, as shown by the Montreal Battery of the Evaluation of Amusia. In addition, A.Z. performed as well as controls when asked to read sentences as statements or questions. These findings confirm that tone-deafness can occur in a purely vocal form. That pitch production was selectively impaired in a musical context suggests that pitch production in music may be supported by mechanisms enjoying domain specificity.