# A.Z.: A case of purely vocal tone-deafness

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The ability to sing is quite widespread in the general population. 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 (e.g., tone-deaf individuals). Poor singing in tone-deafness 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. Singing proficiency was assessed by asking A.Z. 1) to repeat six novel melodies on /la/, and 2) to sing three well-known melodies (e.g., Jingle Bells) at a spontaneous tempo and at a fixed slow tempo. Each performance was analyzed with an acoustically-based method. In all tasks, A.Z.'s performance was impaired in the pitch dimension as compared to controls. Yet, A.Z. was able to sing in time. 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. This deficit can result from impaired brain mechanisms dedicated to pitch production in musical context. It is suggested that pitch production in music may be supported by mechanisms enjoying domain-specificity.