

How good are we at memorizing and recognizing voices?

Thanks to modern technology, we do not experience many situations in which we are required to recognize the voice of a familiar person calling us at the phone; we know who we are speaking to because it pops out on our screen. Without this information, recognizing the identity of our interlocutor could be much harder and even impossible for some persons! It is known that voices carry information on the speaker's unique identity, such as pitch and timbre, which allows us for instance to recognize the gender and the age of our interlocutor. However, the reason why these information are easier to extract for some persons and harder for others, remains unclear.

The study of a still quite unexplored deficit called phonagnosia (from Greek *phone* = voice, *gnosis* = knowledge) could help to clarify the processes underlying speaker recognition. The first case of developmental phonagnosia (where "developmental" means the deficit being present since birth) has been discovered in 2009 in London, where a woman contacted researchers in the field of Neuroscience because she was unable to recognize her relatives' and colleagues' voices. After an extensive testing session, the researchers found that her deficit was specific for voices and did not affect other auditory processes. This discovery opened to the possibility that developmental phonagnosia could be more common than previously thought.

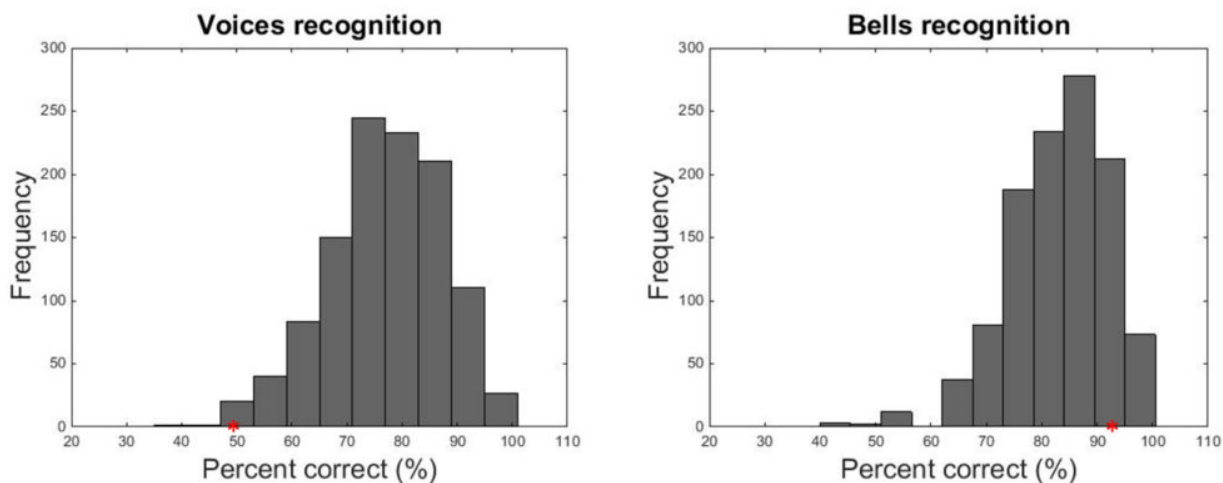


Fig. 1. Histograms representing the distribution of percent correct scores for recognition of voices (left) and bells (right). The red asterisk indicates the performance obtained by the developmental phonagnosic subject KH overlaid on the results of the 1120 subjects of the online test.

A recent scientific study tried to estimate how many persons could be affected by this deficit thanks to an on-line test that is currently accessible from all around the world: the Glasgow Voice Memory Test ([GVMT](#)). This test lasts 5 minutes and assesses the ability to memorize unfamiliar voices of 8 persons, presented as the vowel /a/, and to immediately recognize them among a series of 16

voices (8 already presented and 8 new). A control test requires to perform the same exact task but listening to bell sounds, making possible 1) to exclude a more general auditory deficit and 2) to look at dissociations between the ability to recognize vocal and environmental sounds. 1120 subjects of different ages and nationalities already took the GVMT. Their results are reported in Figure 1. Outliers, which are those subjects whose score departed significantly from the mean, were detected through statistical procedures. These subjects had either a very poor (~20 subjects) or an outstanding performance (~20 subjects as well) in voice recognition and they can be observed at the leftward and rightward extremes of the distribution. One of the main issues of a test measuring cognitive processes is that it needs to be validated; this means that we need to be sure that it is measuring what it aims to measure (in this case, voice recognition abilities). For this reason, the researchers asked the first case of developmental phonagnosic to take this short test, finding that she had a very poor performance in recognizing voices and, at the contrary, no problem at all for bell. Her score is reported as a red asterisk in Figure 1. The fact that she performed randomly for voice recognition supports the hypothesis that this test has a good detection power for voice perception deficits. However, lasting only 5 minutes, the GVMT should not be employed alone to declare a subject as phonagnosic. Further research is currently trying to develop new tests that will be used to assess various aspects of voice perception and to relate individual differences in behaviour to inter-individual variability in structure and function of those areas in the brain encoding human vocalizations.

Nonetheless, we could still be able to gather some information about our interlocutor: the age, the emotional status and the presence of a cold.

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[The Glasgow Voice Memory Test: Assessing the ability to memorize and recognize unfamiliar voices.](#)

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