Do speakers of different languages hear music differently?

Scientists investigate the effect of "native listening" on non-linguistic sounds

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For a while now, neuroscientists have been wondering whether the distortions in the way we perceive foreign languages related to our knowledge of our mother tongue also characterize how we perceive non-linguistic sounds (e.g., music). A new SISSA study, published in the *Journal of Experimental Psychology: Learning, Memory and Cognition*, shows that, despite many clues

seemingly pointing in that direction, speakers of languages with a different rhythm do not differ in their perception of non-linguistic sound sequences.

Knowledge of our mother tongue acts as a sort of auditory "template" that influences the way we perceive the sounds of other languages (scientists call this "native listening"). Several clues, like the fact that many of the cortical auditory regions responsible for linguistic and musical processing are the same and the existence of auditory illusions dependent on the mother tongue or dialect, have led investigators to hypothesize that native listening transfers also to non-linguistic sound stimuli such as music. To investigate this hypothesis, Alan Langus, research fellow at the International School for Advanced Studies (SISSA) of Trieste, Marina Nespor, SISSA professor, and other colleagues used the "iambic–trochaic law", demonstrating that there is no transfer to the non-linguistic domain and that the distortion effects are limited to linguistic sounds.

The way we group notes within continuous sound sequences is determined by the iambic-trochaic law (ITL), whereby we tend to pair sounds of varying intensity or pitch into trochees and those of different duration into iambs. An iamb is formed by two elements in which the stronger element follows the weaker one, and a trochee is exactly the opposite. In other words, when we listen, for example, to a flow of tones that alternate continuously – one strong (S) and one weak (W), if we segment the flow in trochees we hear the sequences as SW-SW-SW-SW…, but if we divide it into iambs we hear the sequence will be WS-WS-WS-WS…
According to the ITL, when sounds vary in either volume or pitch we tend to prefer the trochaic pattern, but when they vary in duration we prefer iambs. Even the phrasal rhythm of a language follows either iambic or trochaic preferences, and each language has its characteristic rhythm: some prefer a iambic pattern (e.g. Italian) others a trochaic one (e.g. Turkish or Persian).

In a series of experiments, Langus, Nespor and colleagues tested whether the preferred rhythm of the subjects' mother tongues also transferred to non-linguistic sounds (musical tones), or even to visual stimuli. "In previous experiments, we found that iambic-trochaic rhythms also exist in the visual domain, and hopefully we would find an analogy between the auditory and visual domain given the existence of visual languages, such as sign languages for the deaf," explains Nespor.

However, the experiments, conducted on native speakers of Italian, Persian or Turkish, provided negative results. It is true ("as we replicated in our study" explains Langus) that the rhythm of spoken language influenced the perception of the sounds of other languages. "However, we

found no transfer of the effect to the other domains of non-linguistic auditory and visual stimuli" concludes the research scientist.

USEFUL LINKS:

- **Articolo originale: http://www.ncbi.nlm.nih.gov/pubmed/26820498**

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