There are at least two “normal” neurological organizations for language and music.

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Sixty years ago, A. Luria noted that right handers with familial left handedness (FS+) recover from left-hemisphere aphasia relatively fast, and show crossed aphasia (right hemisphere lesion) more often than people with only right-handed family members (FS-). Since roughly 40% of people are FS+ this is a significant finding. We report on recent behavioral and imaging studies exploring the possible neurological basis for the effect of familial handedness on language and music in right-handers. Such results call into question whether there is a single unique neurological basis and organization for language: there are implications for understanding the evolution of language on the one hand and therapeutic implications for language disorders on the other hand.

Among other findings, our research (with right handed non-musicians) so far has shown:

1. It is possible to construct a genetic model of the genetic load for left handedness (GLLH), based on 4,000+ 3-generation family handedness pedigrees.
2. FS+ right handers show selectively greater right hemisphere early EEG activation to individual target words, as a function of their GLLH.
3. FS+ right handers show a smaller ELAN than FS- right handers, when hearing phrase-building lexical violations (The trumpet was in-the blown)
4. FS+ right handers show a smaller ERAN than FS- right handers, when hearing a musically odd chord sequence: (I, IV, V, VI.)
5. FS- subjects show a strong differentiation between the ELAN for language violations and the ERAN for music violations. FS+ subjects do not show a consistent pattern.
6. The higher the GLLH, the more likely that responses to violations are in the same hemisphere for both language and music.

The most interesting consideration is that there is normal wide variation in how language and music are represented neurologically: this supports the idea that such capacities are not the result of a universal fixed set of neurological structures. Rather, the neurological organization of such skills is variable depending on more global aspects of an individual’s cerebral organization.

