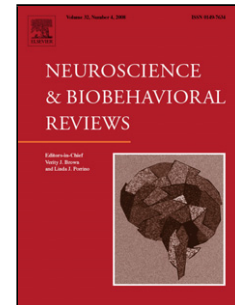


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Determinants of the Mouse Ultrasonic Vocal Structure and Repertoire

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Abstract:

Mouse ultrasonic vocalizations (USV) exhibit a high degree of complexity as demonstrated in recent years. A multitude of factors have been identified to influence USVs on the spectrotemporal as well as structural - e.g. syntactic - level. A synthesis of the various studies that attributes semantics to USV properties or sequences is still lacking. Presently, we address the factors modulating the composition of USVs, specifically age, gender, genetic background (including the targeted FoxP2 mutagenesis), behavioral state and individuality. It emerges that the different factors share a set of common influences, e.g. vocalization rate and frequency range are universally modulated across independent variables described; however, distinct influences exist for sequential structure (different effects for age, behavioral state and genetic background) or vocal repertoire (age). Recently, USV research has seen important advances based on the quantitative maturation of methods on multiple levels of vocalization. Adoption of these methods to address the natural statistics of USV will ultimately benefit several related research areas, e.g. neurolinguistics, neurodevelopmental disorders, multisensory and sensorimotor research.

Highlights:

- Mouse ultrasonic vocalizations (USV) are complex and modulated by various factors
- Age, gender, genetics, and context jointly determine USV properties and structure
- Vocalization rate and frequency range are universally modulated
- Sequence and repertoire are more specifically modulated by a subset of factors

Keywords:

Mouse; vocalization; USV; behavioral modulation; genetic background; development; gender

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