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## Rhythmic facilitation of sensory processing: a critical review

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### **Highlights**

- Neural entrainment to rhythmic stimuli is largely automatic but can be modulated
- Potential confound between rhythmic evoked responses and entrained oscillations
- For hierarchically structured stimuli, entrainment to a basic organizing rhythm
- Link between temporal processing involved in speech and music perception

### **Abstract**

Here we review the role of brain oscillations in sensory processing. We examine the idea that neural entrainment of intrinsic oscillations underlies the processing of rhythmic stimuli in the context of simple isochronous rhythms as well as in music and speech. This has been a topic of growing interest over recent years; however, many issues remain highly controversial: how do fluctuations of intrinsic neural oscillations—both spontaneous and entrained to external stimuli—affect perception, and does this occur automatically or can it be actively controlled by top-down factors? Some of the controversy in the literature stems from confounding use of terminology. Moreover, it is not straightforward how theories and findings regarding isochronous rhythms generalize to more complex, naturalistic stimuli, such as speech and music. Here we aim to clarify terminology, and distinguish between different phenomena that are often lumped together as reflecting “neural entrainment” but may actually vary in their mechanistic underpinnings. Furthermore, we discuss specific caveats and confounds related to making inferences about oscillatory mechanisms from human electrophysiological data.

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