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A better alpha - Incorporating spectral parameterization to improve measurement of listening effort

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Abstract

Understanding and quantifying listening effort (LE) is important to a better understanding of speech perception in acoustically challenging environments. EEG alpha power has shown promise as a measure of LE, but relationships between acoustic challenge and alpha have been inconsistent in prior work. We test whether these mixed findings are attributed to differences in alpha power measurement across studies. We compared traditional bandwidth measurement of alpha power to an algorithmic spectral parameterization (SP) approach which separates alpha from background changes in broadband aperiodic activity. Whereas the traditional approach yielded no significant difference in alpha between speech in quiet versus in background noise, the SP approach, which accounts for flattening of the broadband slope in noise, yielded a significant increase in alpha power to speech in noise. These results highlight the importance of accounting for aperiodic brain activity when considering oscillatory EEG markers of cognitive demand in speech perception.