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Signal duration modulates age differences in neuromagnetic brain activity associated with concurrent sound segregation

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Listeners' ability to parse concurrent sounds is a prerequisite in solving the cocktail party problem. Here, we examine whether deficits in periodicity coding can account for older adults' difficulties in understanding speech in noise. In two experiments, we measured auditory evoked fields (AEFs) while young and older adults listened to complex sounds that either had all of their harmonics in tune or had the third harmonic mistuned by 4 or 16% of its original value. For each participant, the AEFs were modeled with a pair of dipoles in auditory cortex and the effects of age on the resulting source waveforms were examined. Older adults were less likely to report hearing the mistuned harmonic as a separate sound than young adults, but only for short duration signals (50 ms). This age-difference was paralleled by reduced neuromagnetic activity indexing the processing of the mistuned harmonic. For longer duration signals (e.g., 200 ms), older adults show comparable amplitude, but a delay in latency. These findings show an age-related decline in concurrent sound perception based on harmonicity, which could partly be alleviated by increasing signal duration. The implications of these findings for speech perception in noise will be discussed.