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Evidence of neural processing of the interaural correlation between long-duration noises in humans

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When the delay between two correlated sounds is sufficiently short, attributes of the lagging sound are perceptually captured by the leading sound, causing a fused image as coming from the leading-sound location. To investigate neural processing of the interaural correlation between long-duration sounds in humans, we recorded scalp event-related potentials (ERPs) to a transient silent gap that was inserted in long-duration broadband noises presented via headphones. The noises at the two ears were either correlated or uncorrelated. When the noises were correlated but not uncorrelated, participants mainly perceived only one gap image whose inside-head position was modulated by the interaural time difference (ITD). Compared to ERPs when the noises were uncorrelated, the amplitude of the N1/P2 component to the gap was smaller and amplitudes in the latency range of 100 to 200 ms were more imbalanced between the two hemispheres when the noises were correlated. When the ITD for the correlated noises was increased to 16 ms, which was beyond the ITD range for fusion, two gap images were perceived, and the amplitude of the N1/P2 component to the gap became larger and the sustained potentials during 300-500 ms after the gap onset became more negative. [Supported by NSFC].