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Scene analysis without spectral analysis?

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Auditory scene analysis is often described in terms of grouping stimulus components. Components, once grouped, are assigned to one source or another [A. S. Bregman, *Auditory Scene Analysis* (MIT, Cambridge, MA, 2002)]. The actual grouping must operate on whatever representation is available within the auditory nervous system. An obvious hypothesis is that correlates of individual stimulus components are created by peripheral spectral analysis. However, peripheral frequency resolution is limited. The number of resolved partials is between 5 and 8 for a harmonic complex in isolation, but resolution must necessarily be less good for the interleaved components of concurrent sources. Source amplitudes are rarely equal, and partials of a weaker source must be particularly hard to resolve. The question is thus: given the paucity of resolved elements to group, how does the auditory system perform the grouping? A number of possibilities will be reviewed. One is that partials not resolved peripherally are somehow resolved centrally (a modern version of the "second filter" hypothesis). Another is that scene analysis does not operate by grouping resolved elements, but instead by modifying directly unresolved entities, for example by time-domain processing.

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