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Hemispheric Specialization for Language Processes

Although ". . . in studies of dichotic listening, the superior performance of the right ear has been explained as a reflection of the left cerebral hemisphere's subserving linguistic abilities" (*1*, p. 1380), shifts in the *degree* of right ear superiority, with variations in the acoustic structure of competing syllables, cannot be safely interpreted as reflecting shifts in the *degree* of left hemisphere engagement. This limitation exists because an ear advantage in dichotic listening is not a simple index of hemispheric specialization.

Two conditions are necessary for an ear advantage: (i) hemispheric specialization, and (ii) some degree of ipsilateral loss. Ipsilateral loss has been attributed either to suppression of the ipsilateral signal because of the greater number of contralateral fibers (*2*) or to attentional mechanisms associated with spatial orientation toward the side contralateral to the activated hemisphere (*3*).

Either or both of these mechanisms are compatible with repeated demonstrations that the magnitude of the right ear advantage (REA) for dichotically presented speech signals may be significantly increased by embedding both signals in noise (*4*), by reducing their duration (*5*), by selective filtering (*6*), by reducing the spectral distance between competing signals (*5*), by increasing the relative intensity of the right ear signal (*6*, *7*), by delaying the onset of the right ear signal relative to that of the left (*8*), and by variously manipulating the acoustic structure of synthetic syllables (*9*). Thus, the manipulation of transition duration by Schwartz and Tallal was simply one of a class of acoustic manipulations that seem to affect the relative discriminability of contralateral and ipsilateral representations in the left hemisphere. Uncertainty as to whether variations in REA should be attributed to variations in degree of lateralization, degree of ipsilateral loss, or both, is one reason the early promise of dichotic listening as a means of unraveling the processes of speech perception has not been fulfilled (*10*).

Finally, relatively slow changes in spectral structure—as in diphthongs, semivowels, liquids, and fricative transitions—are no less ". . . critical for the processing of fluent speech . . ." than the ". . . rapidly changing acoustic events . . ." (*1*, p. 1381) of stop consonant transitions. It would be odd, indeed, if the neural structures for processing speech had been reared on a capacity for handling a class of events that accounts for perhaps no more than one-fifth of a typical utterance (*11*).

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