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A dichotic listening study of lateralized working memory

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We present data related to the role of working memory in dichotic-listening studies of speech lateralization using consonant-vowel syllable stimuli. A working-memory procedure was actually used in the pioneering dichoticlistening studies by Doreen Kimura in 1960, a fact that was forgotten in later dichotic-listening studies, exclusively focusing on the perceptual aspects of speech sound lateralization. Capitalizing on the original Kimura (1961a, 1961b) studies, we hypothesized that an increase in working-memory load leads to an amplified right-ear advantage (REA) in the dichotic-listening task. A total of 30 participants completed a dichotic-listening task including three working-memory load conditions, each consisting of trials of 3, 4, and 5 dichotically presented letter pairs. Results confirmed an enhanced REA as working-memory load increased. This right-ear effect increased significantly from 3 to 4 stimulus pairs and leveled off with the 5th pair. In addition, the assumption was tested that, within a single load condition, the REA appears mainly in late serial input positions. A detailed analysis of the results revealed that only late positions contributed to the overall REA. However, the highest load condition (5 letter pairs) also produced significant ear differences in the early part of the input position curve. The mechanisms likely to be responsible for these results are discussed in terms of top-down and bottom-up processes in hemispheric asymmetry.