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Factor analyses of critical-band-filtered speech of British English and Japanese

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Two-hundred sentences of British English and Japanese, each uttered by 10 native speakers (5 females and 5 males) in each language, were analyzed through 20 bands of critical band filters. Smoothed power fluctuations derived from the filters were submitted to principal component analyses followed by varimax rotation. The first three factors explained 34-37% of variance. One of the factors exhibited two peaks along frequency axis in the standardized scores and two of the factors showed one peak for each. These three factors divided the whole frequency range of speech sound into four bands. The structure of the factors and frequency bands was essentially the same across the two languages. These frequency bands can be used for speech perception in general, because intelligible noise-vocoded speech sounds can be synthesized with the frequency bands.