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Fetal rhythm-based language discrimination: a biomagnetometry study

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Abstract

magnetocardiography was recorded while the participants were presented first with passage 1, a passage in English, and then, following an 18 min interval, with passage 2, either a different passage in English (English–English condition: N=12) or in Japanese (English–Japanese condition: N=12). The fetal magnetocardiogram was reconstructed following independent components analysis decomposition. The mean interbeat intervals were calculated for a 30 s baseline interval directly preceding each passage and for the first 30 s of each passage. We then subtracted the mean interbeat interval of the 30 s baseline interval from that of the first 30 s interval, yielding an interbeat interval change value for each passage. A significant interaction between condition and passage indicated that the English–Japanese condition elicited a more robust interbeat interval change for passage 2 (novelty phase) than for passage 1 (familiarity phase), reflecting a faster heart rate during passage 2, whereas the English–English condition did not. This effect indicates that fetuses are sensitive to the change in language from English to Japanese. These findings provide the first evidence for fetal language discrimination as assessed by fetal biomagnetometry and support the hypothesis that rhythm constitutes a prenatally available building block in language acquisition.

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