Decoding of Auditory Sequences in Working Memory Using Meg

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Submitter Anna Kasdan

Affiliation New York University

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Presentation Abstract Summary Computational models of working memory primarily derive from studies investigating the maintenance of individually presented visual items. It is not known whether such models generalize to sequentially presented auditory items. We assessed how the human brain keeps track of sequences of auditorily presented syllables in working memory, combining magnetoencephalography (MEG) and machine learning. Seventeen participants completed a match-to-sample task: they heard a target sequence of 2, 4, or 6 syllables that they compared to a probe sequence presented 2.5 s later. First, our results show that we can decode each syllable in a sequence from approximately 100 to 500 ms after syllable onset, confirming that the brain's evoked responses are sufficient to decode syllable information. Second, we can decode target and probe congruency starting from 200 ms into the sequence until the end of the sequence (500 ms), suggesting that memory matching mechanisms depend on late neural processing relative to syllable encoding. However, memorized targets 1) could not be decoded from the MEG signals and 2) did not modulate the neural responses to the probes. Together, these results challenge current computational models and suggest that auditory working memory is not encoded in sustained neural activity.

Co-author Information

* Presenting Author

First Name	Last Name	Affiliation	E-mail
Anna *	Kasdan *	New York University	anna.kasdan@nyu.edu
David	Poeppel	New York University, Max Planck Institute for Empirical Aesthetics	david.poeppel@nyu.edu
Jean-Remi	KING	New York University	jeanremi.king@gmail.com

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