



Temporal and Neural Dynamics of Musical Contexts

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Introduction

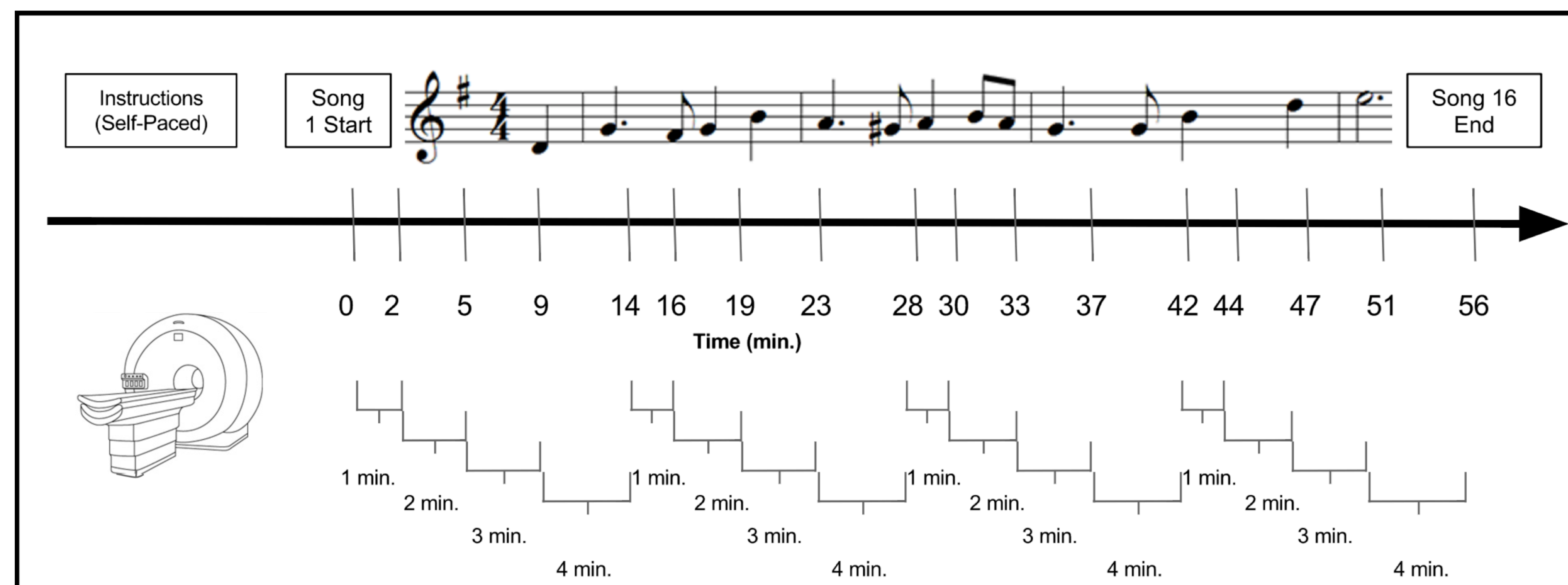
Naturalistic stimuli, such as movies and audio narratives, have been shown to elicit activity patterns in high-level cortical regions (e.g., posterior medial network¹) that code for abstract features of the current situation. These neural representations have the following properties: they are stable within events and vary across events, changing abruptly at moments corresponding to human annotations of event boundaries²; they code for features of specific events, e.g., characters in a story³; and these event-specific codes are shared across participants, supporting cross-participant decoding³.

Hypothesis

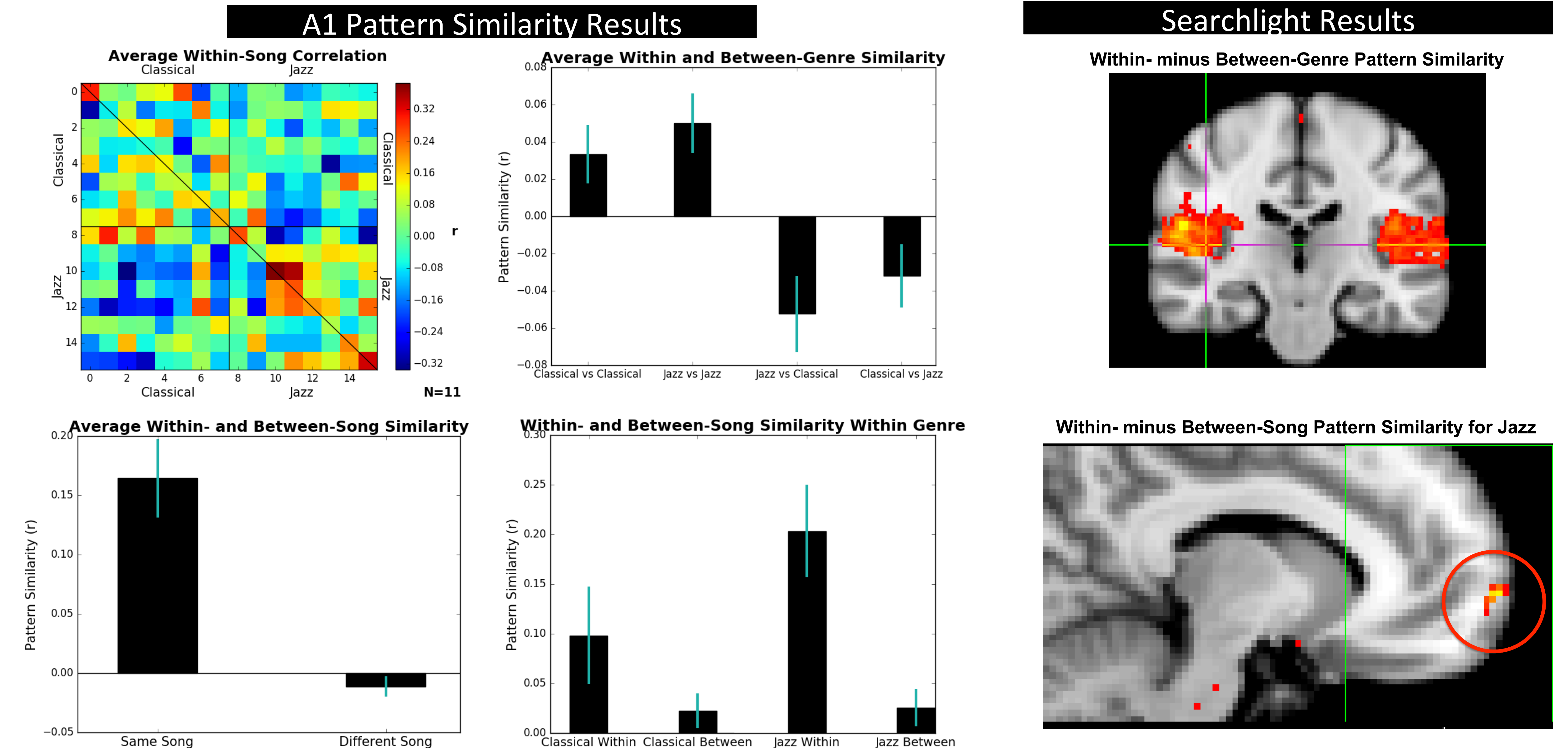
Here, we use a searchlight approach⁴ to look at pattern similarity for low and high-level song features across the brain. We predict that low-level features of music (e.g. auditory markers of genre) will be represented in sensory regions of cortex such as A1, while higher-level features (e.g. full songs) will be represented in higher-level regions of cortex such as the posterior medial network.

Design and Methods

The stimuli used were 16 songs distributed equally between two genres (jazz and classical). The durations of the songs were also distributed equally such that each genre consisted of eight 1-4 minute songs. Participants were required to listen to these 16 songs for two days prior to a third day of listening in an fMRI scanner. During the scanning session, participants listened to the set of 16 songs twice in random order. We used a searchlight to investigate pattern similarity between data from the two scans. After acquiring maps of these similarity scores we performed permutation tests to get Z-statistic maps (see Results, $Z > 1.3$, uncorrected) that reflect the comparison of our real data against a null distribution.



Results



Discussion and Future Directions

- Searchlight pattern similarity for within- minus between-genre comparisons were highest in A1.
- Searchlight pattern similarity for within- minus between-song comparisons were highest in mPFC.
- These findings support the hypothesis that low-level features are represented in sensory cortex (e.g. A1) while higher-level features are represented in higher-level cortical regions (e.g. mPFC).
- Future analyses will include inter-subject correlation, functional connectivity, and a Bayesian RSA searchlight.

References and Acknowledgments

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