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we recorded their in-ear EEG signal . The acoustic features of high-groove pieces were analyzed by VGGish, a pre-trained neural network, to make a linear lasso model estimating groove sensation from acoustic features (Model 1). Additionally, we developed a general linear lasso model classifying the individual EEG pattern into the state of listening to high-groove or low-groove music (Model 2). Utilizing Model 1, the acoustic features of 7000+ candidate excerpts were ranked based on the estimated groove sensation. While listening to the playlists, Model 2 estimated the groove sensation from EEG in real-time, which re-trained Model 1 and updated the ranking. We thus created four playlists for each participant: two using only Model 1 (groove-increasing-playlist [GIP] and groove-reducing-playlist [GRP]) and two using both models (GIP-EEG and GRP-EEG). Participants listened to these playlists and evaluated their "desire to move" using a VAS. We employed a one-way analysis of variance (ANOVA) to compare the "desire to move" ratings across the playlists. The results showed a significant main effect of the playlist type ($F(3,9)=7.65$, $p=0.007$), with post-hoc analyses showing that GIP-EEG enhanced the "desire to move" compared to GRP-EEG ($p=0.02$) and GRP ($p=0.02$). Our findings indicate the potential of EEG-informed systems to create personalized music playlists increasing the groove sensation for each listener.

Beatmatching in DJing: An analysis of temporal coordination using electroencephalogram (EEG), motion capture, and audio analysis

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Subtheme B - Auditory, Motor and Sensory Integration

DJing is a sophisticated musical skill involving complex temporal perception and active manipulation of multiple, often polyrhythmic patterns simultaneously. In the process of beatmatching, DJs synchronise two different records that are out of phase or playing at different tempo. This is an embodied, dynamic activity relying on a coordinated system of processes in the body, the brain, the turntables and the sonic patterns in the music. The aim of this work is to explore the interactions occurring between these dynamic processes and to compare them over a set of behaviours commonly exhibited during beatmatching. We collected audio, EEG, and motion capture data from 28 DJs. The task was to beatmatch two tracks initially playing at different phases (shifted one sixth of a bar) or tempi (130 vs 135 bpm) using digital turntables with the automatic sync function turned off. We then extracted a phase representation for each dataset to study synchronisation between the two tracks and body movement. In initial analysis of the audio, we extracted the dynamic changes to the tracks over time, identifying windows of distinct behaviour. In the movement data, we identified associated windows of rhythmic movement locked to the beat. Together, these analyses provide a clear picture of the behavioural modes. Using these results, we then compared functional neural connectivity across different behavioural modes including slip cueing, nudging the platter, adjusting the pitch control, and monitoring the resulting mix. In this poster, we will present preliminary EEG analyses relating the combined audio and motor modes to features of the functional networks. This research has potential to improve understanding of the role of movement, brain states, and their interactions in coordinating the beatmatching process. More broadly, this work supports an embodied approach to studying how humans coordinate complex rhythmic behaviours to complex rhythmic stimuli in their environments.

Oscillatory coding of natural speech and music via spectrotemporal modulations in the human auditory cortex

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Subtheme B - Auditory, Motor and Sensory Integration

Speech and music represent the most intricate ways through which humans use sound to convey information. Recent studies increasingly indicate that the human brain is finely tuned to encode the temporal and spectral features of sound that are crucial for processing speech and music, respectively. Despite considerable progress in unraveling the mechanisms underlying the processing of these spectrotemporal features, much of our current knowledge originates from studies using artificial, lab-created stimuli, raising concerns about the generalizability of findings to real-world scenarios. To address this limitation, we conducted stereo-electroencephalography (sEEG) recordings on ten patients with implanted electrodes while they listened to a natural stimulus: the first seven minutes of the soundtrack from Harry Potter and the Philosopher's Stone.