

# Do we dance with music or does music make us dance? Arms' movements at EDM parties

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## Background

Electronic Dance Music (EDM) is a genre created to be played at parties and danced by a large audience. Some of its rhythmic features are the strong salience of the main, regular beat (usually between 120-150 bpm), and the looped formal patterns in multiples of four (beats, measures, sections) (Butler, 2003). Embodied music cognition understands the synchronization of human movements and musical features as music-induced movements, both in everyday life listening and in dance contexts, including EDM dance (Burger & Toiviainen, 2020). It was shown that all feet movements of the audience at EDM parties are organized in only 2 motion patterns, metrically aligned with musical meter (Marchiano & Martínez, 2019). Based on that previous work, we propose to extend the analysis to the audience arms' motion patterns and their synchronization with metrical structure of music. Because EDM parties are highly cultural contexts, we also expect to find non-alignments with music and shared motion patterns that shows some cultural constrains (BaerVELdt & Verheggen, 1999).

## Aims

We aim to describe and identify arm's motion patterns, and analyze their alignment with metrical structure of music.

## Method

Material: an audiovisual recording of an EDM party's dancefloor in La Plata City, Argentina. Analysis: microanalysis of 20 people's arms' movements (100 seconds each), based on the constant comparative method of Grounded Theory. An observational code was developed and adjusted during the analysis, with 2 categories based on Laban's Effort-Shape Theory (Laban, 1971) and 1 category of motion alignment to metrical structure of music: (i) moving arm segment (upper and/or lower), (ii) direction (horizontal, sagittal and/or vertical), (iii) and temporal alignment of motion's change of direction with a metrical level of music (eighth-note level, tactus, two beats and/or four beats). Once patterns were identified and described, time length of each occurrence of a pattern was annotated, and percentages of each category were calculated. All annotations and numerical analysis were made in Excel

## Results

We identified 2 main motion patterns, both defined by (i) lower arm movement, (ii) one on the sagittal axis (40.9% of the total analyzed time) and the other on the horizontal (44.6%); other similar 2 patterns were predominant (i) but performed by the upper arm (sagittal=6.5%; horizontal=3.6%). All motion patterns are formed by 2 internal movements: a direct, linear movement and its repetition in the opposite way, returning to the initial position. These internal movements have always the same length (i.e. each internal movement is half the total length of one pattern). (iii) All patterns are aligned with metrical structure of music: each motion pattern has the total length of one main beat or tactus (40.1%), 2 beats (47.6%) or 4 beats (9.8%). Patterns are usually repeated multiple times before changing to the next (99.5%). People don't necessarily move with the same patterns at the same time, which shows that there isn't any relation of pattern's spatial features with music, because different persons use different patterns at the same musical moment.

## Conclusions and Implications

Temporal features of arms' movements are fully aligned with metrical structure of music, suggesting a strong embodied effect of music in human behavior and supporting the idea of music-induced movements. Also, looped motion patterns can be interpreted as a general form of alignment with the looped sonic patterns of EDM's formal structure. Conversely, spatial directions of movements don't seem to be related to music. Given that all people share a small set of spatially defined motion patterns, it is probable that the spatial directions are culturally defined. While embodied metrical alignment seems to be caused by music's rhythmic saliences, space distribution of movement involved seem to be a cultural trait of electronic dance. In future studies, we plan to make cross-cultural analysis of electronic parties to go deep into these questions

## References

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