

Music as environment: movement cues as descriptors of musical experience

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Background

Enactivism considers cognitive processes as originated in perceptually guided-actions; it sees cognitive activity as an outcome of the circular dynamic interactions between an organism and its environment (Schiavio et al., 2017), and the minds as inherent attributes of bodies in the world (Di Paolo et al., 2017). From this perspective, body movement might bring cues to explore self-organization phenomena of musical experience.

We focused on physical movement properties employing two analytical frameworks: (a) impulsiveness based in Effort Laban's model that relates low-level physical movements to mid-level expressive qualities; and (b) Recurrence Quantification Analysis (RQA) Entropy, from Dynamic Systems Theory.

Aims

To explore movement features that account for differences in the dynamical interaction between the musical 'organism' and the musical environment.

Method

Assumption: if a given movement pattern is configured as an environmental coupling of music and movement, the repetition of the pattern without music might lose structural and/or expressive features prompted by the music.

A paired designed experiment was carried out where seven musicians (all right dominant handed) were asked to choose, perform, and loop hand-movement patterns in two conditions: (i) [+MaE] while listening to an Argentine chacarera rhythm of one-minute duration (Music as Environment); and (ii) [-MaE], preserving and repeating the movement pattern just performed without the chacarera rhythm's soundtrack. Hand movements were captured with infrared cameras. Calculations were run analysing the time series' Euclidean velocity, as to find differences in the expressive quality of movement (impulsiveness) and the pattern organization (RQA entropy) between conditions.

Results

As regards impulsivity values, movement patterns exhibited in [-MaE] a decreased as compared to [+MaE]. Left hand's impulsivity accounted for the found difference ($M_{diff} = -0.93$, 95% CI [-1.72, -0.15], $N = 7$, $r = .94$) showing a medium sample effect size ($d_{unbiased} = 0.35$, 95% CI [-1.21, 0.40]). Right hand's impulsivity showed no effect.

As to entropy values, movement patterns also exhibited an overall decrease in [-MaE]. In this case, both hands decreased in the same way. Considering both-hands movement as a whole, the result shows a moderate effect size ($M_{diff} = -0.29$, 95% CI [-0.63, 0.06], $d_{unbiased} = 0.43$, 95% CI [-0.97, 0.08], $N = 14$, $r = .61$).

Our analysis was exploratory. An independent replication is needed to reduce potential carryover effects on the experimental design.

Conclusions

Impulsiveness could be assumed as a cue that accounts for the way our interaction with music is expressed by more energized body movements. Additionally, we interpret entropy as a cue that informs about how interaction with music organises our movements, conveying structure, order and predictability to them.

The differences between [+MaE] and [-MaE] suggest that our dynamic interaction with the musical environment nourishes our experience, prompting expressive and structural alignments in our embodied sense-making.

References

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