From Heartbeat to Musical Beat: Initial Investigation in Healthy Older Adults

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References :

INTRODUCTION

While extensive research has been conducted on the impact of music on cardiac activity, the **reverse influence** has been less examined. Yet, cardiac arrhythmias, more common with age, may **disrupt** our ability to synchronize precisely with musical rhythms.

METHODS

Participants
- 38 healthy adults aged 50-75 years
- Both musicians and non-musicians
- No neurological or cardiac condition

Tasks
- Unpaced finger-tapping at the participant's chosen pace
- Paced synchronization to a metronome set at tempi of 450, 600, and 750 ms between piano tones

Behavioral variables
- Tapping regularity (unpaced tapping): SD of intertap intervals (ITI) / Mean ITI
- Synchronization consistency (paced tapping): Logit-transformed measure of how consistently taps cluster around the beat

Physiological variables
- Mean heart rate (beats/min)
- Heart Rate Variability measured as Root Mean Square of Successive interval Differences (RMSSD)

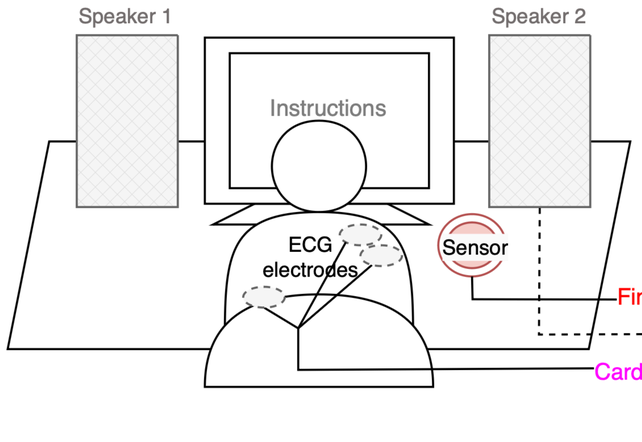
RESULTS

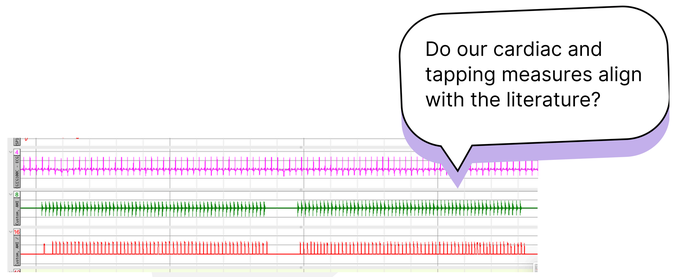
- Participants showed tapping variability, synchronization consistency, heart rate and heart rate variability consistent with healthy population norms (Dalla Bella et al., 2024; Shaffer & Ginsberg, 2017)
- In line with the literature, the heart rate variability (HRV) was highest at rest
- Tapping variability was highest in medium paced compared to unpaced, slow and fast paced tapping conditions
- However, the relation between heart beats and taps remains to be established.

DISCUSSION

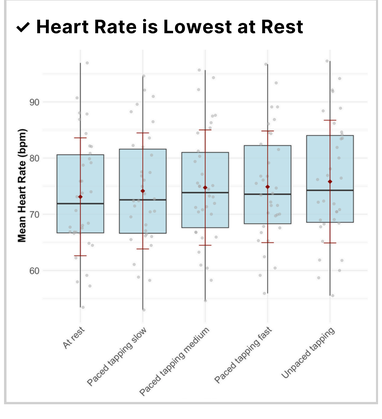
The current work constitutes the foundation for our subsequent analyses which will directly test the relationship between tapping regularity and heart rate variability in the normal population and in persons presenting cardiac arrhythmias, known as atrial fibrillation.

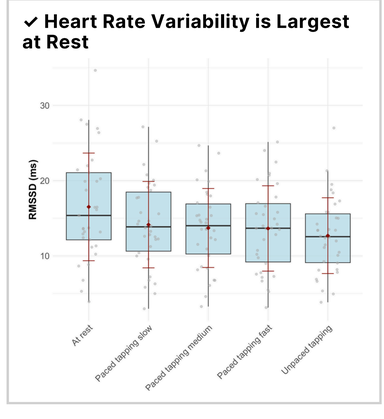
Objective : Validate a novel apparatus designed to assess whether changes in **heart rate variability** seen in aging may affect **rhythmic synchronization**.



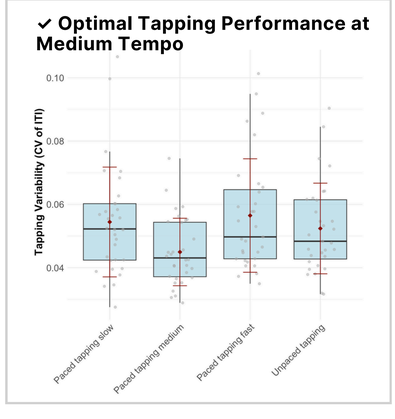


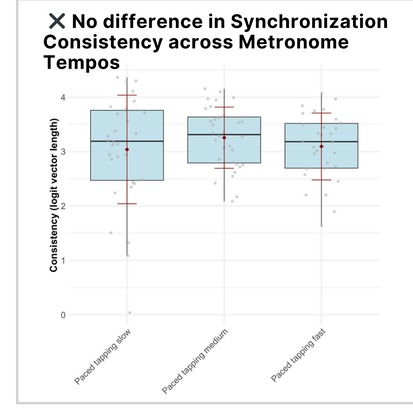
Cardiac measures





Tapping measures





Next step: Examine the relation between heart beats and taps