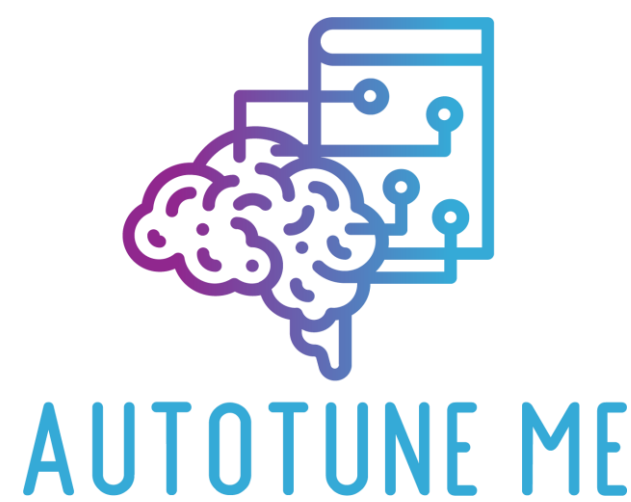


Quantifying Autonomic Responses to Music-Based Interventions in Dementia Care



Haoran Zhou¹, Nan Jiang¹, Qiqi Zhou², Katsuo Kurabayashi¹, Kendra Ray²
¹Mechanical and Aerospace Engineering, NYU Tandon, NYU Tandon School of Engineering, Brooklyn, NY
²NYU Langone Health, New York, NY, ³Autotune Me, New York, NY

A synchronized multimodal framework linking wearable physiology, music context, and behavioral observation can capture participant-specific responses during music-based interventions in dementia care.

INTRODUCTION

METHODS

RESULTS

CONCLUSIONS

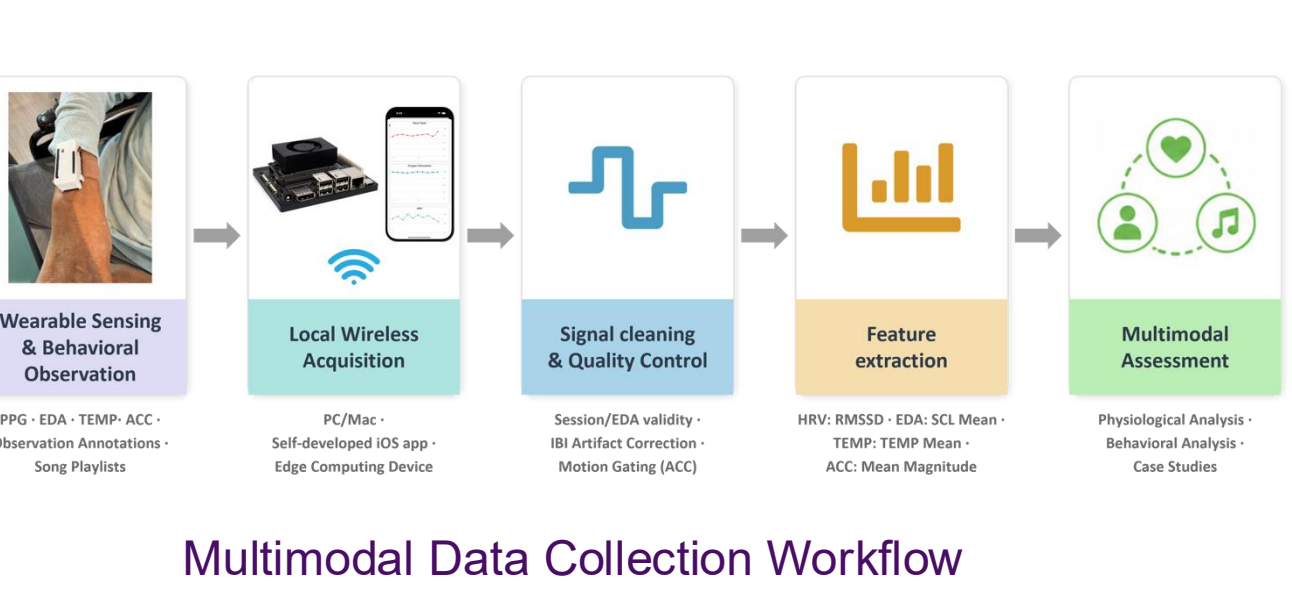
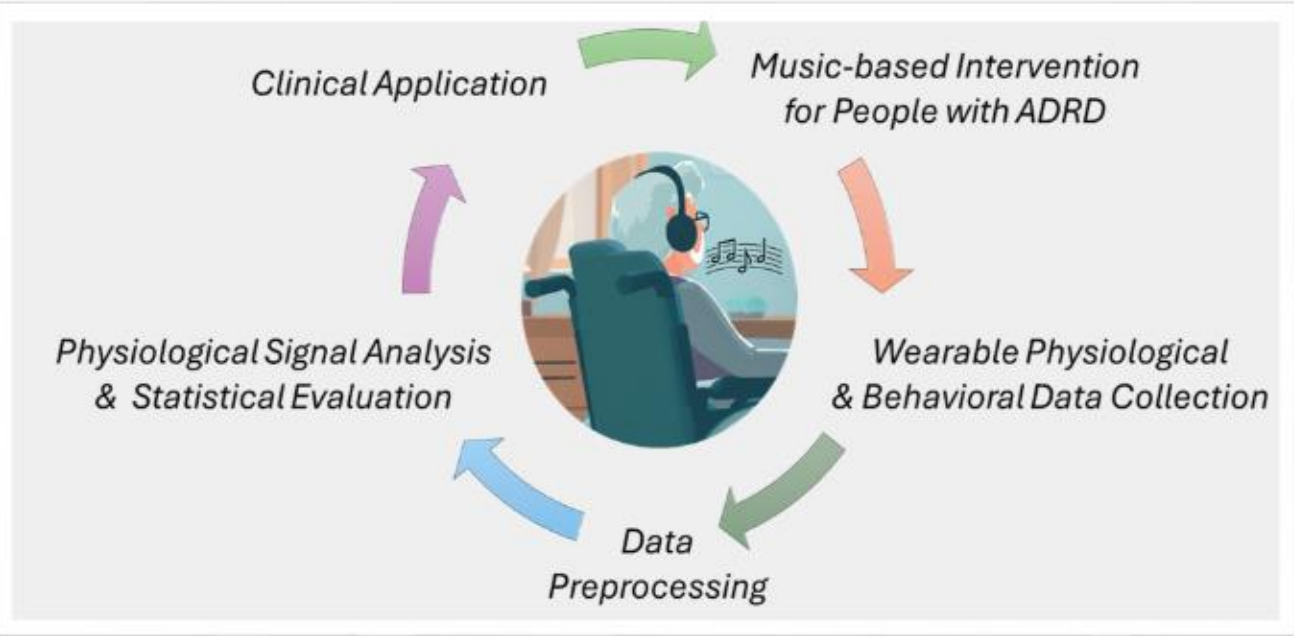
REFERENCES

Music-based interventions are widely used in dementia care to support mood, engagement, and behavioral symptoms.

However, participant responses during music sessions are often characterized mainly through behavioral observation, with limited objective physiological measures.

Wearable sensing may provide additional information about moment-to-moment responses, especially when physiological signals are synchronized with songs, session timing, and observed behavior.

This pilot study examined the feasibility of collecting synchronized physiological, behavioral, and music-context data during music-based interventions and explored how responses varied across participants, sessions, and songs.

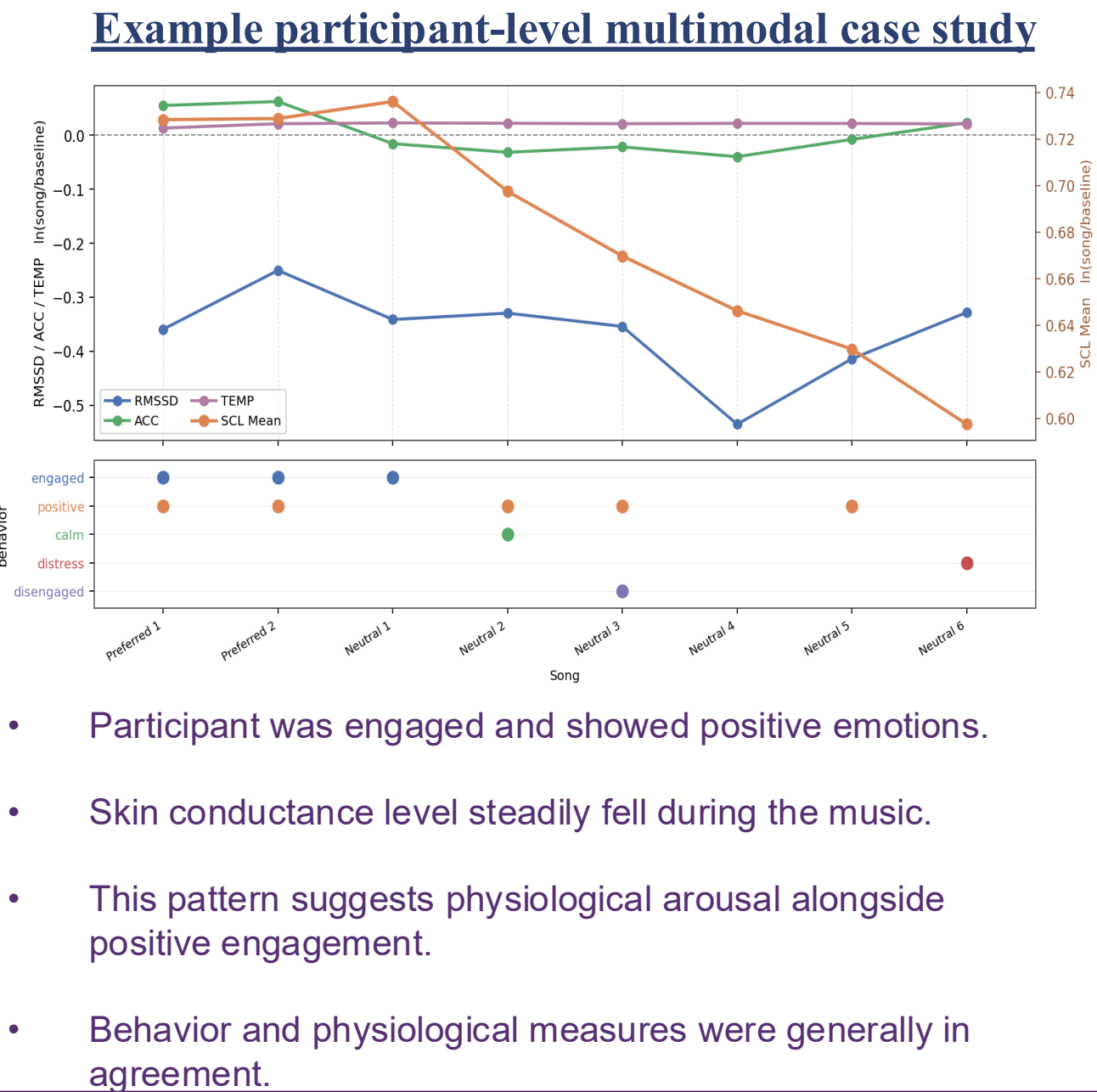
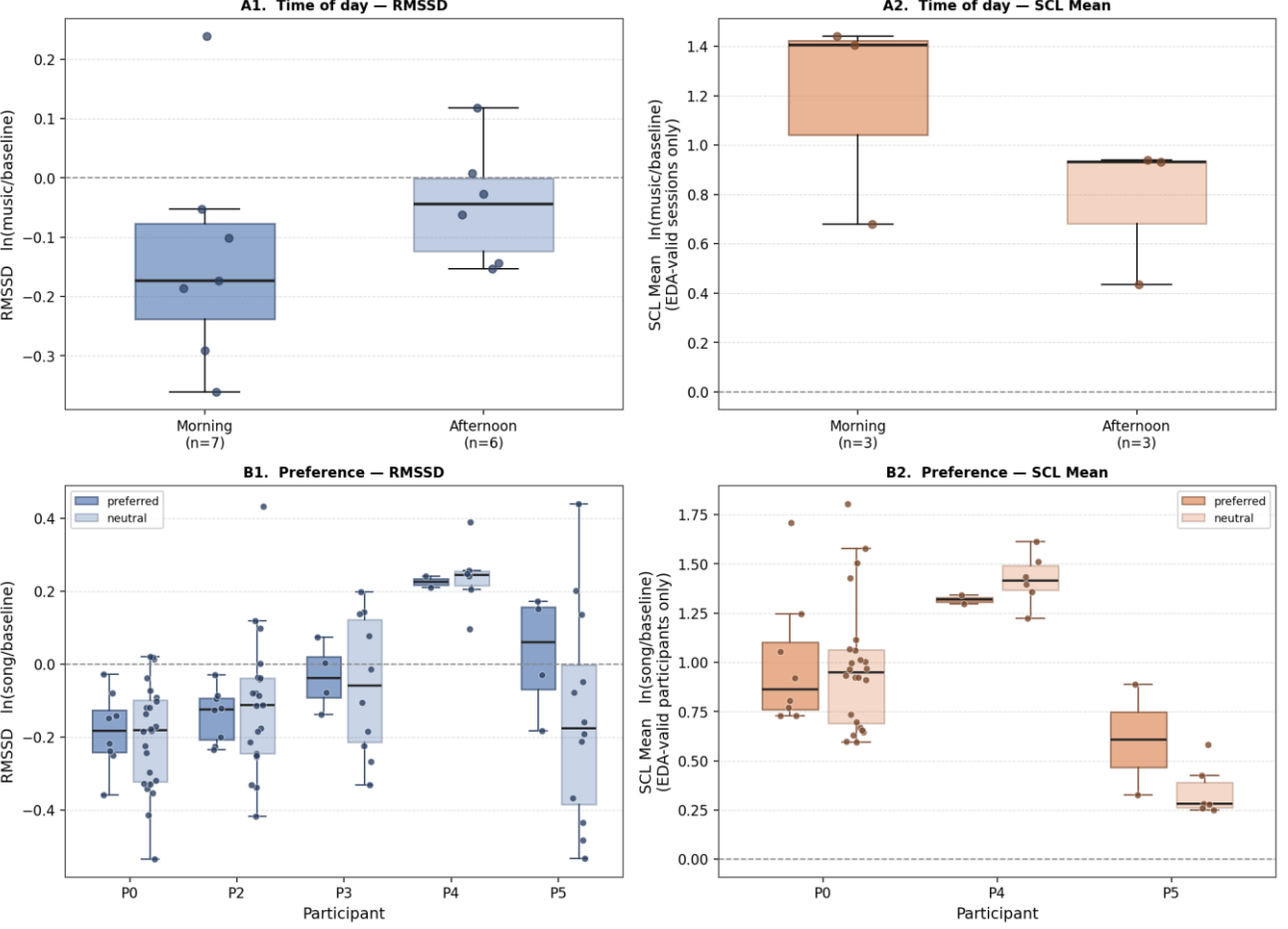


- 5 participants
- 13 sessions
- 99 music segments
- 248 behavioral observations

A wrist-worn wearable sensor collected PPG, EDA, skin temperature, and accelerometry.

Physiological signals were synchronized with intervention playlists and time-stamped behavioral observations.

Exploratory analyses examined responses across session phases, songs, time of day, and music preference.



This pilot study demonstrates that synchronized wearable physiology, behavioral observations, and music-context data can be collected during structured music-based intervention sessions with people living with dementia.

Across sessions, participants showed heterogeneous behavioral and physiological responses, suggesting that music-based intervention effects may not follow a single group-level pattern.

The exploratory findings highlight the value of participant-level analysis, especially when examining responses by session phase, individual song, time of day, and music preference.

Physiological and behavioral measures did not always align, indicating that these data streams may capture complementary aspects of how participants respond during music listening.

The resulting multimodal dataset provides a basis for future studies on personalized and adaptive music-based interventions in dementia care.

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CONTACT

Kendra Ray, Ph.D.
Kendra.Ray@nyulangone.org

Katsuo Kurabayashi, Ph.D.
kk5165@nyu.edu

HaoRan Zhou
HZ2206@nyu.edu

Qiqi Zhou, MPH
QZ2650@nyu.edu