



Background

Interpersonal physiological coordination is the coordination of physiological signals between individuals over time that occurs during an interaction. It is thought to represent coregulation of attention and arousal^{1,2} and is associated with prosocial behaviour³.

Persons with Dementia (PWD) often experience impacts on the quality of their significant relationships (e.g., with friends, family, partners, or caregivers)⁴. Programs that encourage connecting with others may thus help improve relationships for PWD.

We predicted that moments of connection between PWD and caregivers during a movement program would be associated with interpersonal physiological coordination, which might also depend on physiological mode.

Previously collected data:



n = 5 caregivers

Methods



Group movement program with solo and duo activities

Video coding for moments of reciprocal connection⁵

Physiology collected with triple-point sensor:

- Electrodermal activity (EDA)
- Heart Rate (HR)
- Skin Temperature (TEMP)

Analysis

1. Preprocessing (filtering and trimming)

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2. Non-linear measures of synchrony using optimal parameters: a. Normalized Symbolic Transfer Entropy (NSTE)

• Measures information transfer from one signal to the other (directional)

b. Single Session Index (SSI)

• Based on the ratio of positive to negative correlations of the slopes between two signals (non-directional).

*For further details on data analysis, contact E.F.

Interpersonal Physiological Coordination in Persons with Dementia During a Dance-**Based Movement Program** Erica Flaten^a, Dannie Fu^b, Stefanie Blain-Moraes^{b,c}

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Different measures of synchrony (NSTE & SSI) may differentially pick up on moments of connection

- Valence of SSI may reflect how PWD and caregivers modulate arousal together during the different activities. High, unidirectional NSTE may reflect leader/follower roles during the movement program.
- It may matter which physiological mode is used for 2. measuring coordination.
 - predominantly temperature coordination
- https://doi.org/10.1177/1088868316628405

BIAPT

Preliminary results

Case 1: P4P10

For higher resolution figures of all the dyads of interest, go to this <u>link</u>.

Conclusions

Case 1 showed predominantly EDA coordination, while case 2 showed

Limitations:

- shared activity and perceptual input.
- Low sample size.
- No p values for the NSTE yet.

Future Directions:

- shared input.
- for each participant.
 - Cross-modal applications of NSTE and SSI

References

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Main findings:

Case 1

- Negative SSI during activities 3 and 4, predominantly in EDA.
- Increase in $X \rightarrow Y$ NSTE, and positive SSI in EDA during a noncoded moment where P4 & P10 took turns standing on one foot and supporting each other.

Case 2

• Increase in $X \rightarrow Y$ NSTE, and negative SSI in TEMP in the only coded moment of connection during activity 3

Overall, coded moments of connection often did not line up with physiological coordination.

• It is possible there could be physiological synchrony due to

Controlled experiment to manipulate behavioural synchrony and

• Use machine learning to determine dominant physiological mode