Relations between parent and child heart rate variability and self-regulation

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INTRODUCTION

- Heart rate variability (HRV) is thought to be a general marker of self-regulation (Appelhans & Luecken, 2006; Beauchaine, 2015).
- Higher HRV theoretically reflects a person's capacity to flexibly modulate levels of arousal in response to changing environmental demands (Thayer & Lane, 2000).
- Self-regulation is thought to emerge out of emotionally attuned, synchronous early interactions with caregivers (Shore, 2001)
- Synchronization of HRV during parent-child interactions may have implications for children's self-regulation.

STUDY AIMS

AIM 1: Describe the patterns of correlation between parent and child HRV during collaborative problem-solving tasks

AIM 2: Determine whether these patterns relate to children's independent self-regulation.

HYPOTHESIS: Higher correlation between children's HRV and their caregivers' will be associated with children's heightened capacity for regulated responses.

METHODOLOGY

Children and their caregivers participated in the Preschool Reflection and Metacognitive Monitoring (PRaMM) study at UNL, which is currently ongoing.

PARTICIPANTS:

- Children aged 3 to 5 years old (current N= 17, M age = 3.6, 9 boys and 8 girls) attended a laboratory-based assessment with their primary caregivers.
- 51% Caucasian, 11% Hispanic, 11%, Asian, 9% African American, & 9% Other Ethnicity
- Caregiver education level: on average had an associate's degree or some college experience .

PROCEDURES: Parents and children participated in joint problem-solving tasks, including determining how to make a bubble-blower work, and building a 'Lego' structure together, while wearing an Actiheart monitor.

Caregivers completed a demographic survey and the Deveraux Early Childhood Assessment (MacKrain, et al, 2007).

RESULTS

As child HRV (M=41.23, SD=25.38) increases, caregiver HRV (M=72.19, SD=83.05) tends to increase as well, r(17)=.66, p=.014 (see Figure 1).

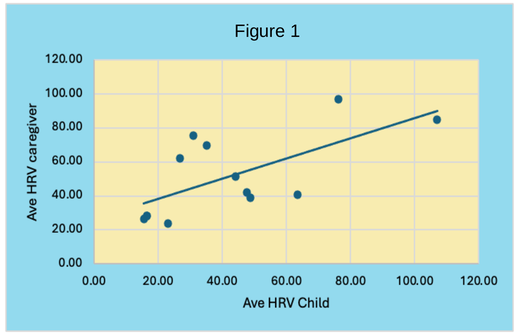
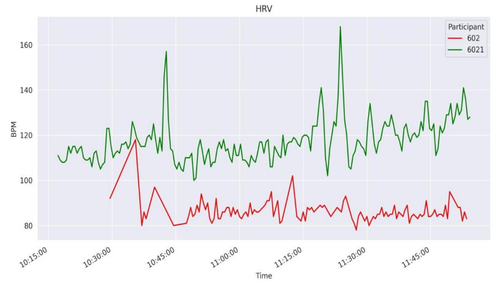
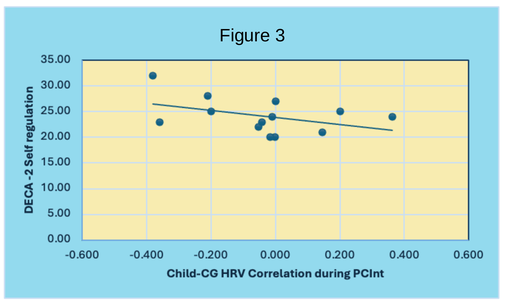


Figure 2: Example of changing caregiver and child HRV values through the session



There were no significant relations between the parent-child HRV correlation and children's DECA self-regulation scores after accounting for child age and activity level (β = .13, p = .68, R^2 = .47) (see Figure 3).



DISCUSSION

KEY TAKE-AWAYS:

- Parent-child HRV correlation is robust (r =.66), but surprisingly not related to self-regulation
- Due to the ongoing nature of the project, as we obtain a larger sample size, we expect to observe changes in the correlations in the changes to HRV and self-regulation

NEXT STEPS:

- Replicating this study in a natural setting like the home could give a more accurate picture of HRV synchrony
- More research is needed on the teacher-child HRV match and the effect on children's self-regulation skills.

BLAB LAB
The UNL brain, learning & behavior lab

For full references, full PRaMM data sets, and other inquiries regarding the approaches or results outlined above, please contact Patricia Cardellini via email at pcardellinidealmei2@huskers.unl.edu