SAA 2019

Is infant crying in the ear of the beholder?

Examining the relationship between mothers' perceptions of daily infant crying and maternal depression

Megan Micheletti, Xuewen Yao, Mckensey Johnson,
Sherryl Goodman, & Kaya de Barbaro

Accessing daily activity

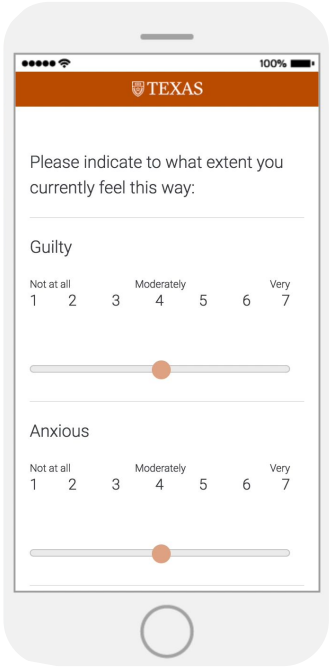
Motion, physiology

Continuous audio

Accessing daily activity

Motion, physiology

Continuous audio

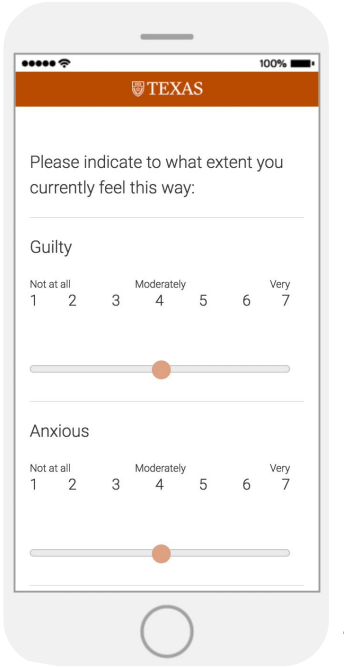


Mood, social support, self-competence, stress, depression, anxiety

Accessing daily activity

Motion, physiology

Continuous audio



GPS,
cell phone use

Mood, social support, self-competence, stress, depression, anxiety

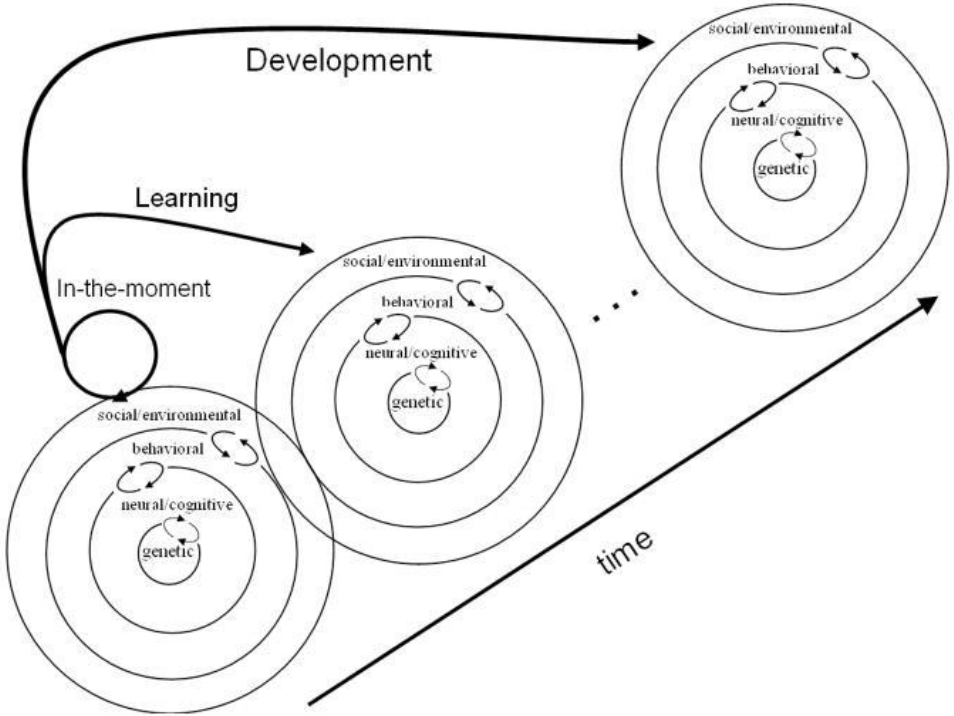
Mother-infant dynamics

- Synchrony
- Play
- Patterns of interaction
- Maternal response to distress
- Maternal sensitivity

Do moms with depression exhibit less physiological synchrony with their infants?

Is there a relationship between mother and infant sleep and their patterns of interaction?

Individual differences in mother's sensitivity to infant distress?



Spencer, Perone, Buss (2011)

Objectives

- Infants of mothers with depression cry more than infants of mothers without depression (Milgrom, 1995; de Werth et al., 2003; Van der Wal et al., 2007; Field et al., 2007)

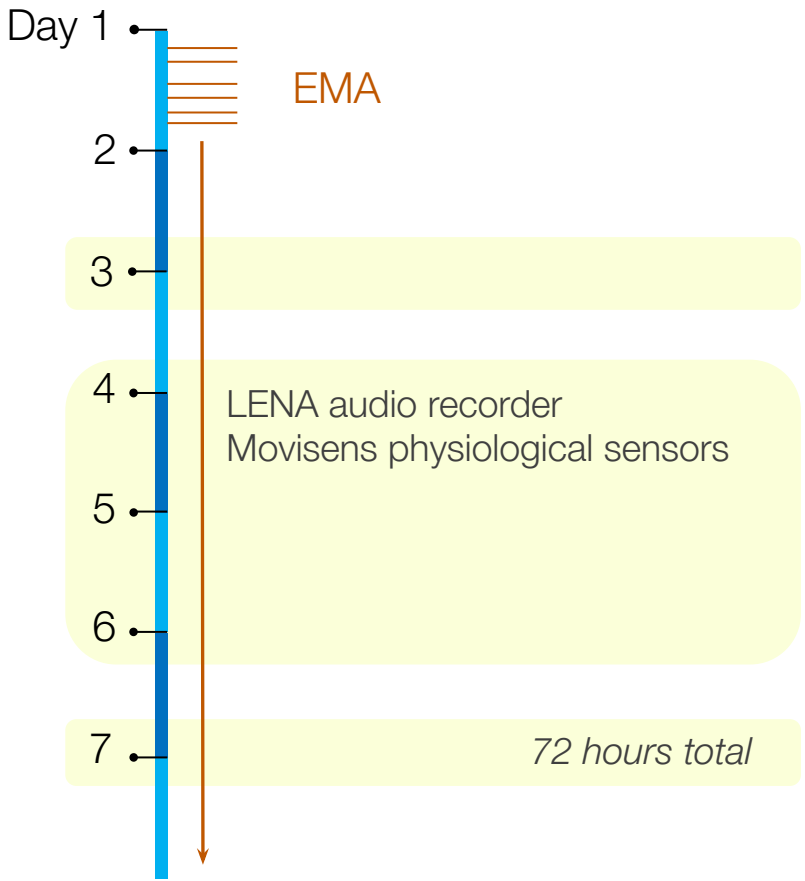
- Mothers with depression report more negative behaviors in their children compared to teachers or clinicians (Mcgrath, Records, & Rice, 2008; Briggs-Gowan et al., 2003)

Do mothers with more depressive symptoms have infants that cry more, or do mothers with more depressive symptoms over-report their infant's crying?

Participants

N = 42

Infant Age (weeks)	20.7 (11.5)
Male	52%
Maternal Age (years)	31.2 (4.2)
Race	
Caucasian	59%
More than one	34%
Education	
Graduate School	47%
College	37%
High School	16%
Employment	
Full time	44%
Not out of home	42%



Measures

- Edinburgh Postnatal Depression Scale (EPDS)
- LENA audio recorder worn in vest for 23.5 (1.7) hours

- Infant crying per day

  Parent-reported: average of estimated minutes crying per day for the past 3 days

  Audio-detected: within the same week, minutes crying per day normalized to 24 hours for all participants

  - Automatically extracted from LENA software (0.37 kappa, 0.52 correlation; >80% reliable coders)
  - Kernel density estimation using ‘cry’ and ‘vocalization’ features from LENA (0.49 kappa, 0.85 correlation; >80% reliable coders)

Measures

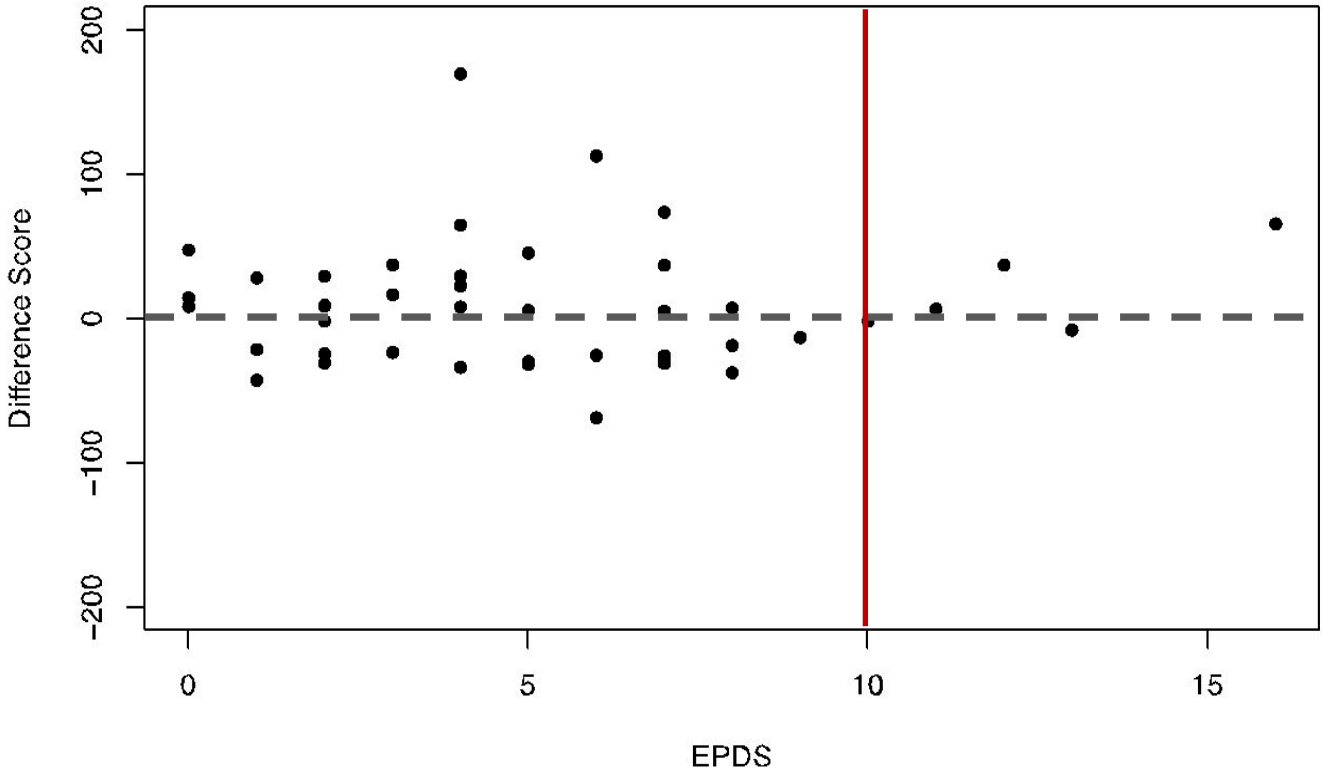
- Edinburgh Postnatal Depression Scale (EPDS)
- LENA audio recorder worn in vest for 23.5 (1.7) hours

- Infant crying per day

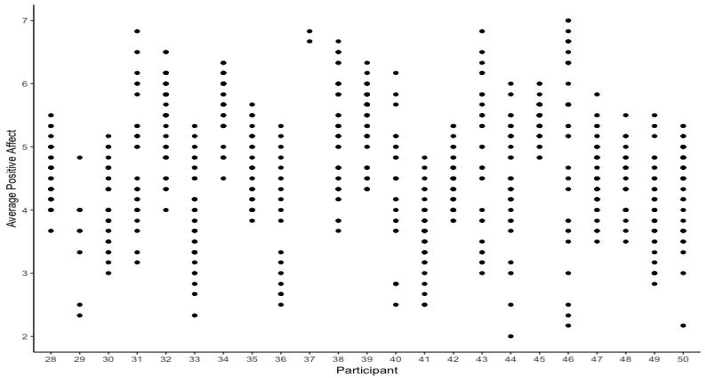
Difference Score:

Parent-reported mins crying/day — **Audio-detected** mins crying/day

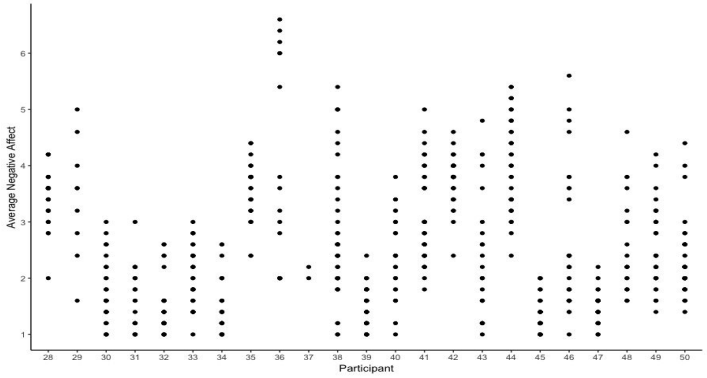
Difference Score x EPDS



Multilevel Modeling



Positive Affect (PA): 45% variance is within participants; 55% between participants

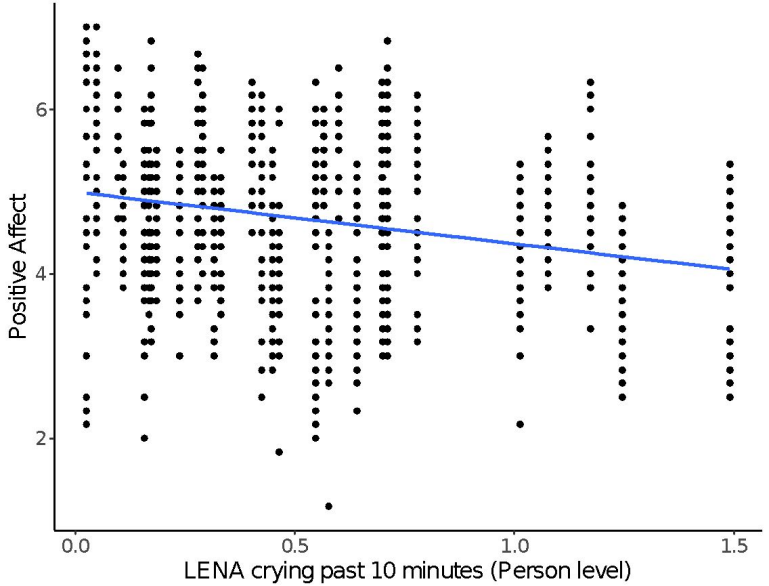


Negative Affect (NA): 43% variance is within participants; 57% between participants

- Objective infant crying (time-locked to EMA responses throughout the day)
- Objective hours of mother and infant sleep last night
- Subjective social support mother received today

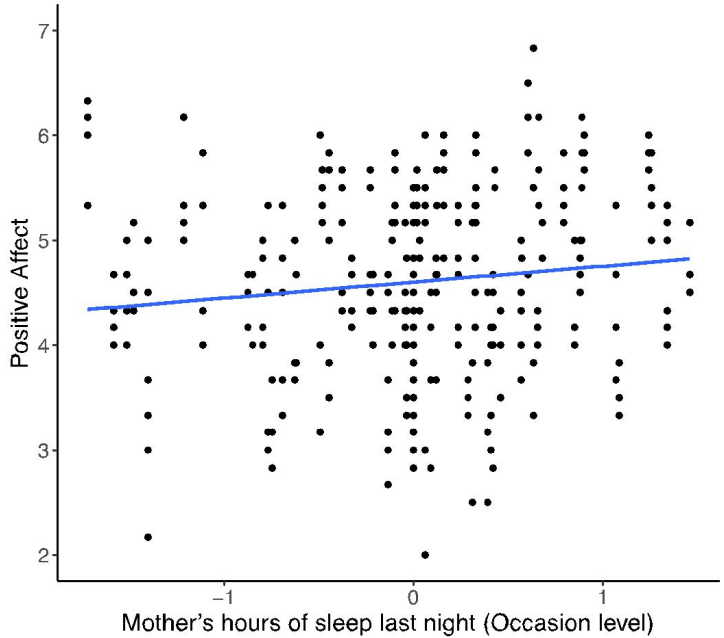
Infant crying time-locked to EMAs

Positive Affect	Occasion level		*p*-value
	Crying past 10 minutes	-0.0017	0.222
	Crying past 30 minutes	-0.0574	0.0785
	Crying past 1 hour	-0.0247	0.215
	Crying past 3 hours	0.0050	0.568
	Person level		
	Degree of crying past 10 minutes	-0.6096	0.0514
	Degree of crying past 30 minutes	-0.0452	0.797
	Degree of crying past 1 hour	-0.0794	0.568
	Degree of crying past 3 hours	-0.1069	0.19



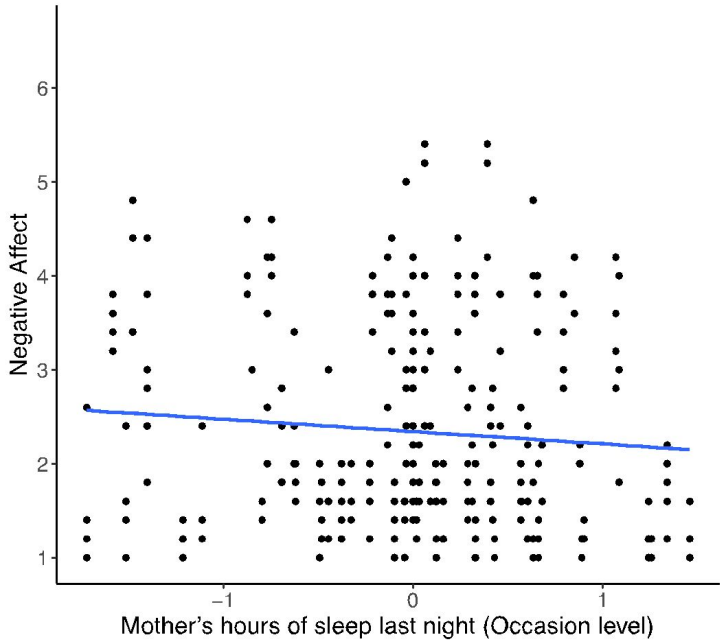
Hours of sleep last night

Positive Affect	Occasion level		*p*-value
	Mother sleep quality	0.1522	0.0033
	Infant sleep quality	0.05756	0.0461
	Person level		
	Mother sleep quality	-0.07057	0.397
	Infant sleep quality	0.08950	0.282



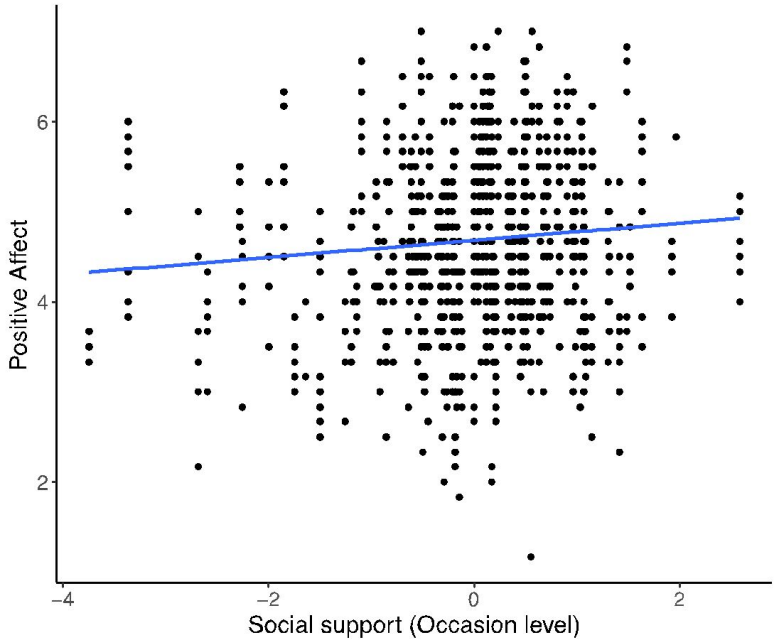
Hours of sleep last night

Positive Affect	Occasion level		*p*-value
	Mother sleep quality	0.1522	0.0033
	Infant sleep quality	0.05756	0.0461
	Person level		
	Mother sleep quality	-0.07057	0.397
	Infant sleep quality	0.08950	0.282
Negative Affect	Occasion level		
	Mother sleep quality	-0.13124	0.00487
	Infant sleep quality	-0.02319	0.37
	Person level		
	Mother sleep quality	-0.02491	0.8473
	Infant sleep quality	-0.2176	0.0848



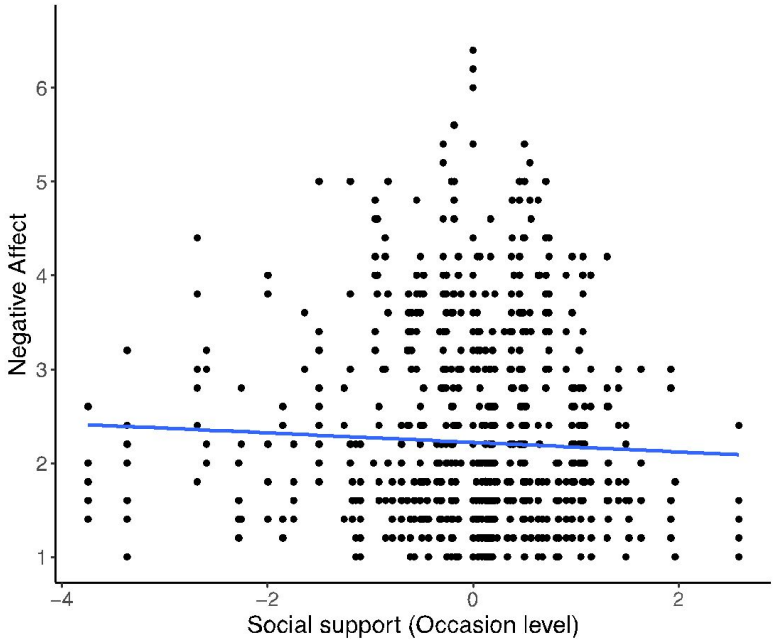
Social support today

Positive Affect	Occasion level		*p*-value
	Social support	0.0945	< 0.001
	Person level		
	Social support	0.2345	0.0304



Social support today

Positive Affect	Occasion level		*p*-value
	Social support	0.0945	< 0.001
	Person level		
	Social support	0.2345	0.0304
Negative Affect	Occasion level		
	Social support	-0.0677	< 0.001
	Person level		
	Social support	-0.1824	0.11



Discussion

- Mothers with more depressive symptoms are not systematically biased in their over- or under-reporting of their infant's crying

- More crying 10 minutes before an EMA reduces PA (between), but not for crying 30 minutes, 1 hour, or 3 hours prior to an EMA
- More mother and infant sleep improve PA (within)
- More mother sleep reduces NA (within)
- More social support improves PA (between/within) and reduces NA (within)

- Methodological considerations
  - Timescales
  - State vs Trait
  - Contextual input is critical

Acknowledgments

Our wonderful participants

Daily Activity Lab at UT Austin

Xuewen Yao, MS

Kaya de Barbaro, PhD

Support

K01MH111957-01A1 de Barbaro

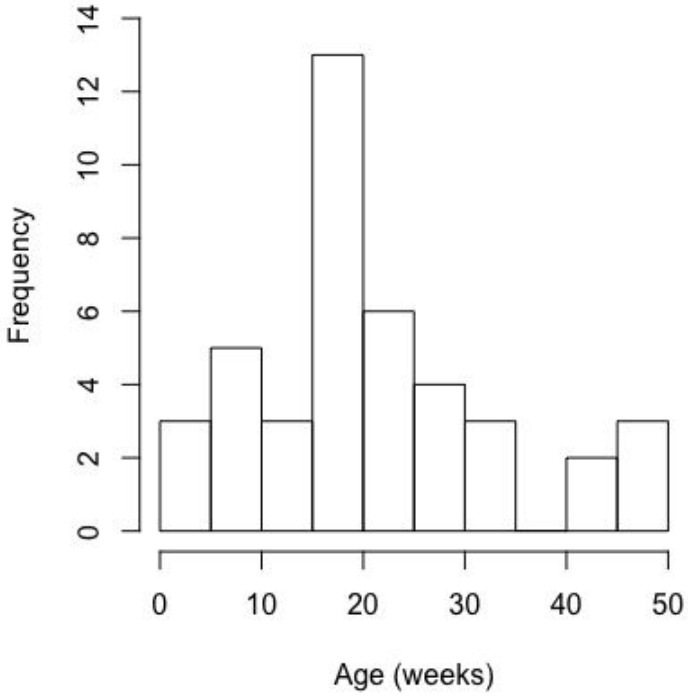
NSF GRF 2018-257208 Micheletti

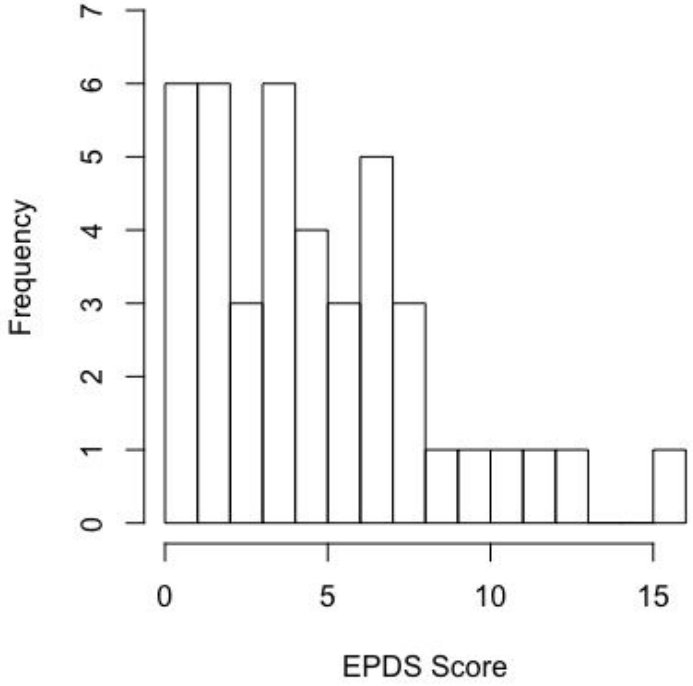
Questions?

m.micheletti@utexas.edu

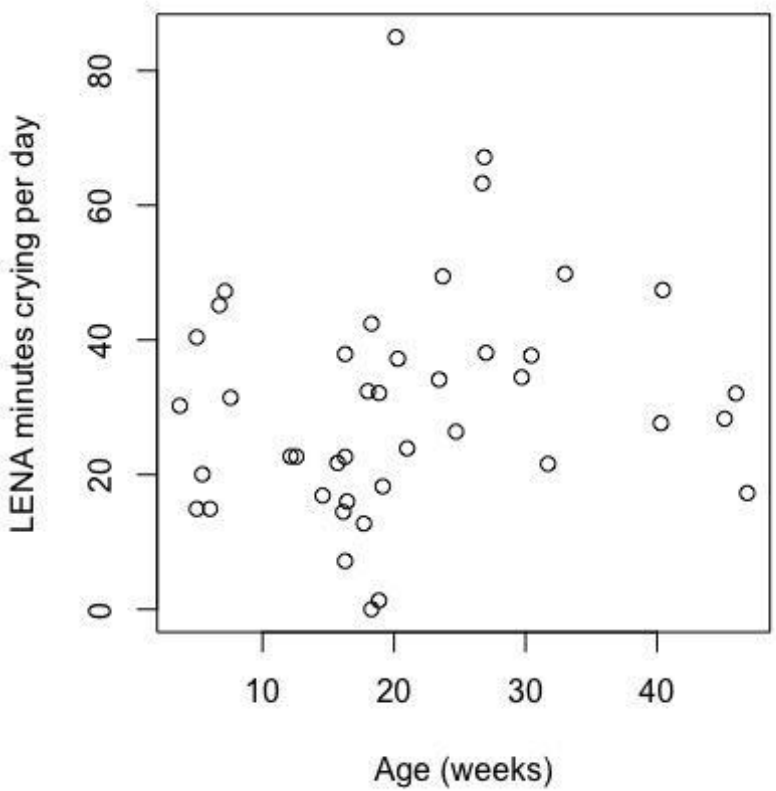
extra slides

Results

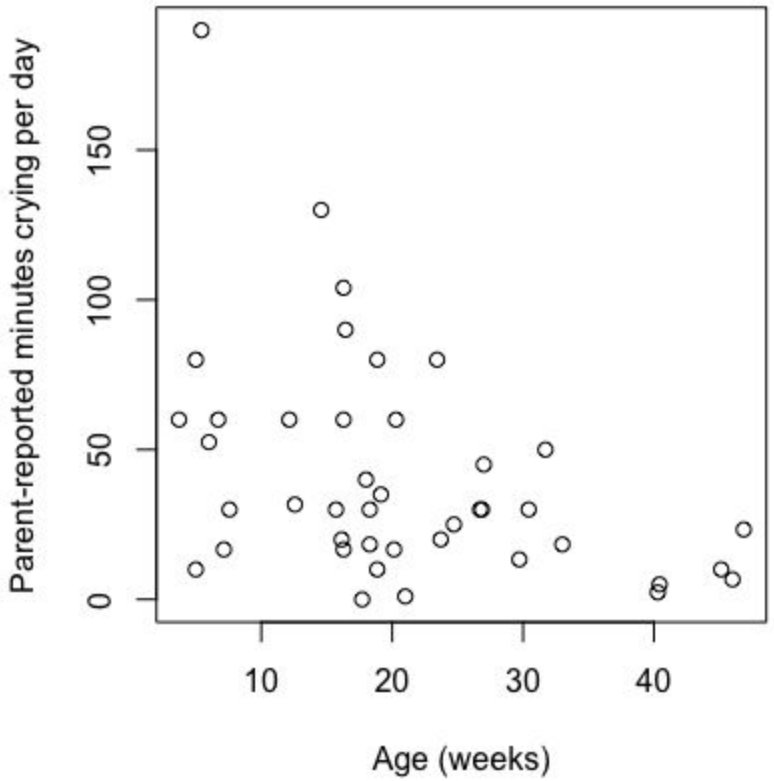

Frequency
0
2
4
6
8
10
12
14
0
10
20
30
40
50
Age (weeks)


Frequency
0
1
2
3
4
5
6
7
0
5
10
15
EPDS Score

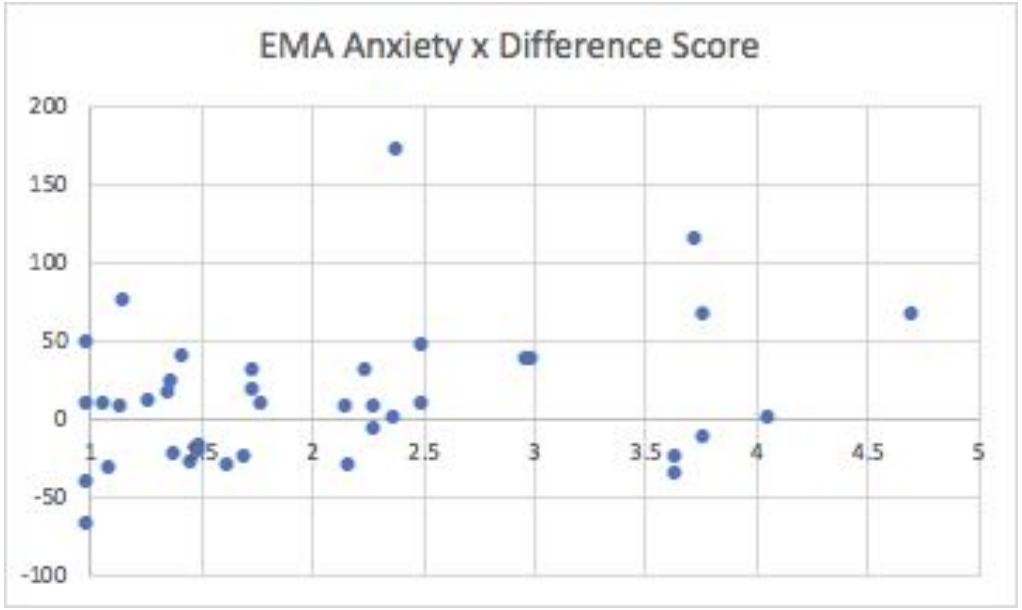
Age x LENA minutes crying per day



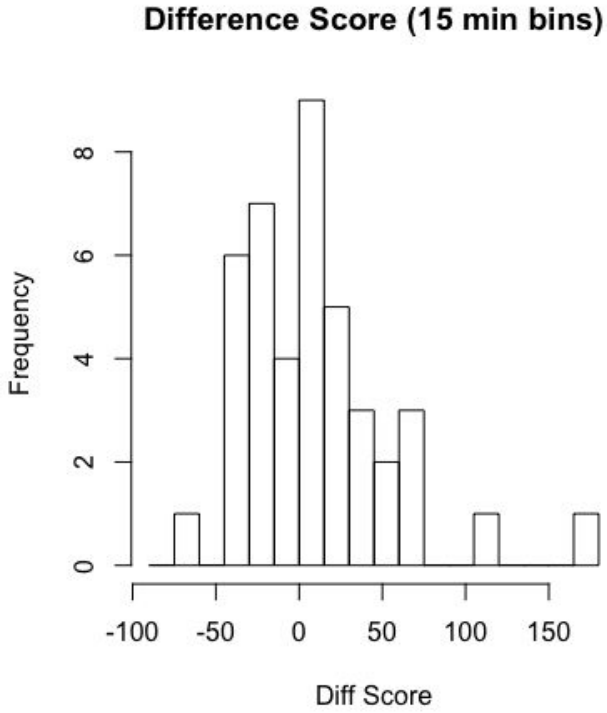
Age x Parent-reported minutes crying per day



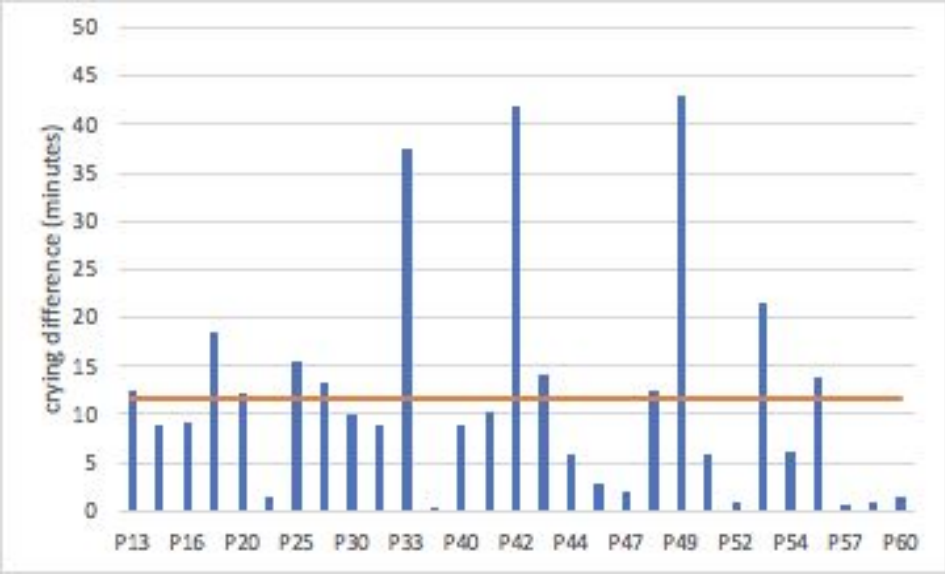
EMA Anxiety x Diff Score

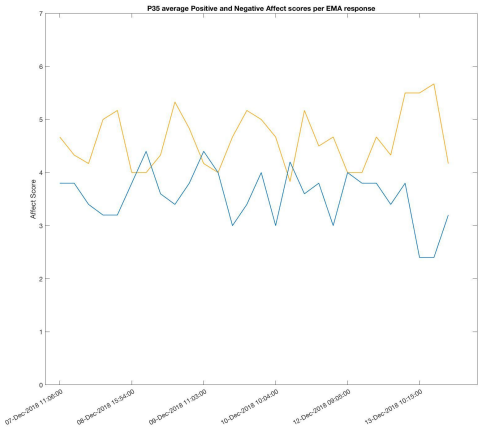


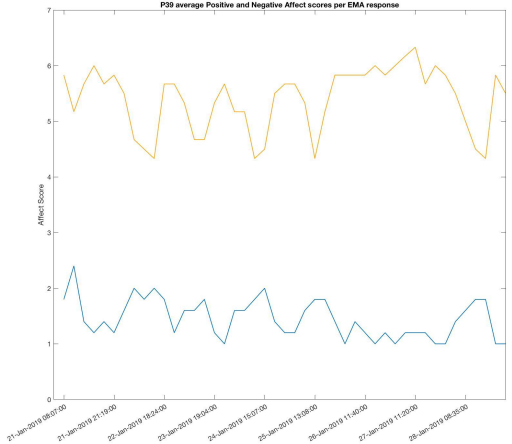
Difference scores (parent-reported - LENA minutes crying per day)

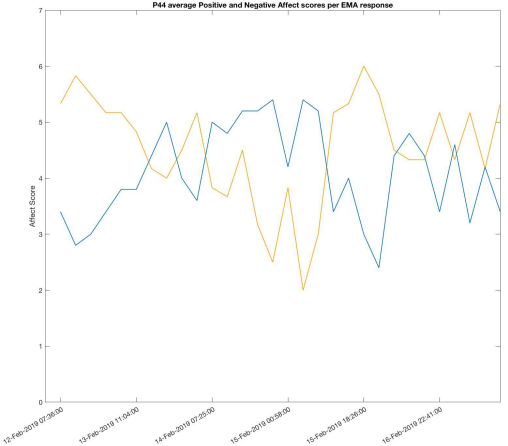


Between-day crying variability (in minutes) for participants with multiple 24h recordings

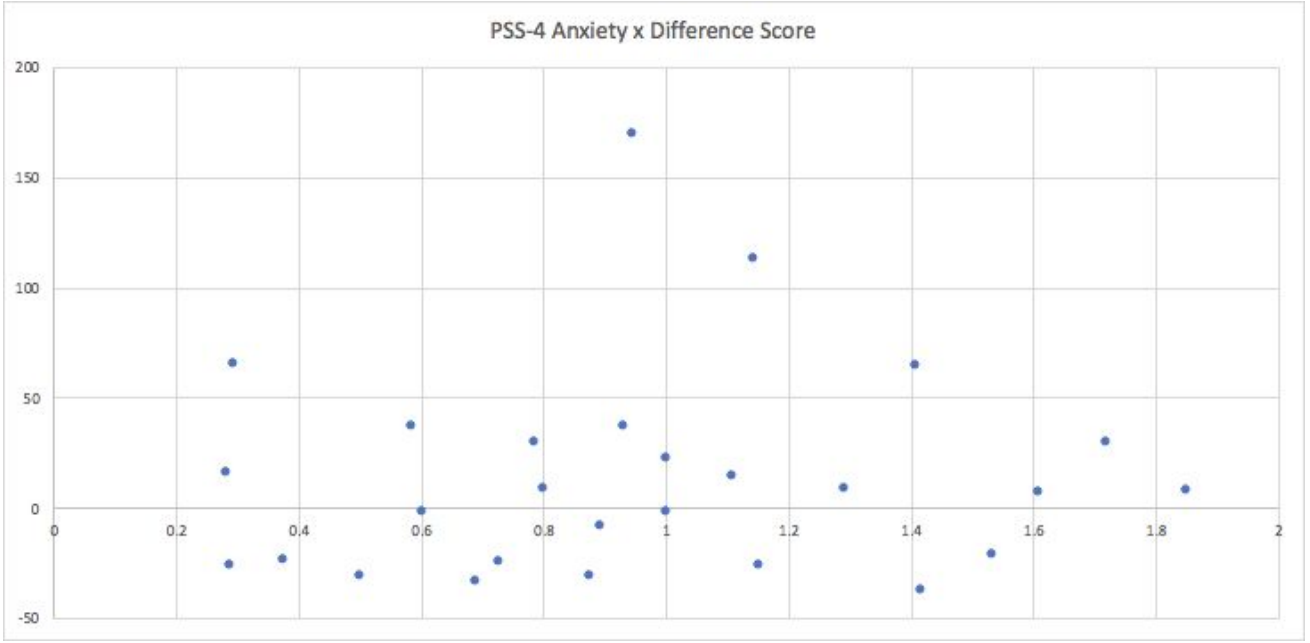



P35 average Positive and Negative Affect scores per EMA response
Affect Score
0
1
2
3
4
5
6
7
07-Dec-2018 11:06:00
08-Dec-2018 15:34:00
09-Dec-2018 11:03:00
10-Dec-2018 10:04:00
12-Dec-2018 09:05:00
13-Dec-2018 10:15:00

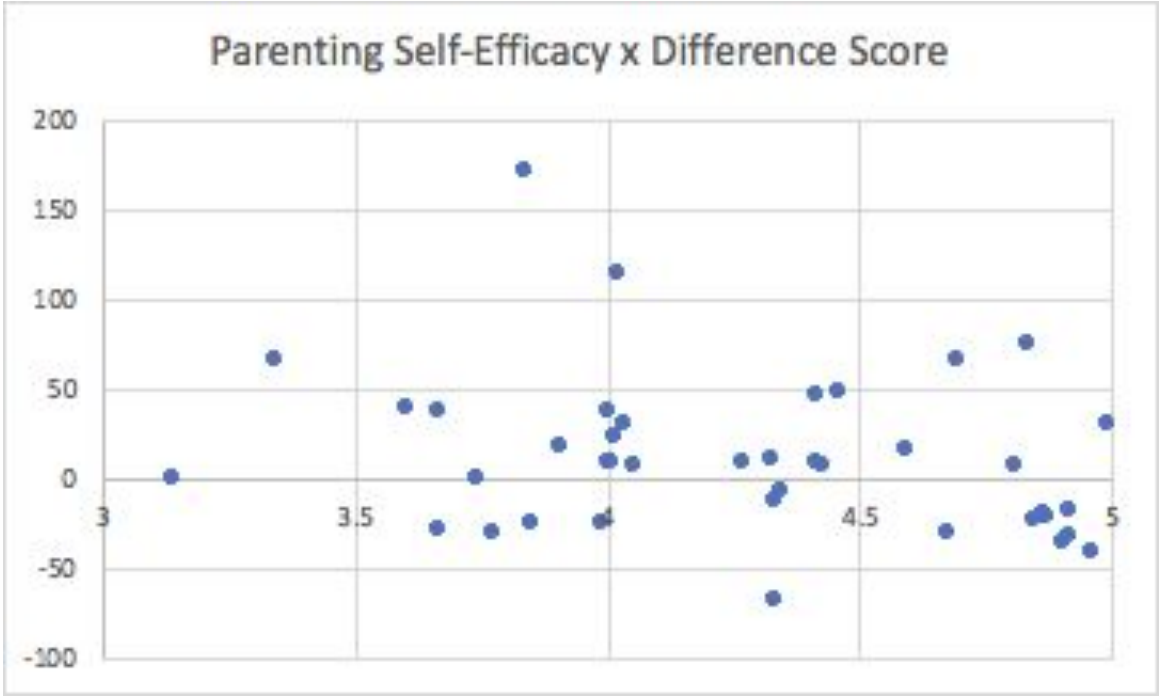

P39 average Positive and Negative Affect scores per EMA response
Affect Score
0
1
2
3
4
5
6
7
21-Jan-2019 08:07:00
21-Jan-2019 21:19:00
22-Jan-2019 18:24:00
23-Jan-2019 19:04:00
24-Jan-2019 15:07:00
25-Jan-2019 13:08:00
26-Jan-2019 11:40:00
27-Jan-2019 11:20:00
28-Jan-2019 08:35:00


P44 average Positive and Negative Affect scores per EMA response
Affect Score
0
1
2
3
4
5
6
7
12-Feb-2019 07:36:00
13-Feb-2019 11:04:00
14-Feb-2019 07:25:00
15-Feb-2019 00:58:00
15-Feb-2019 18:24:00
16-Feb-2019 22:41:00

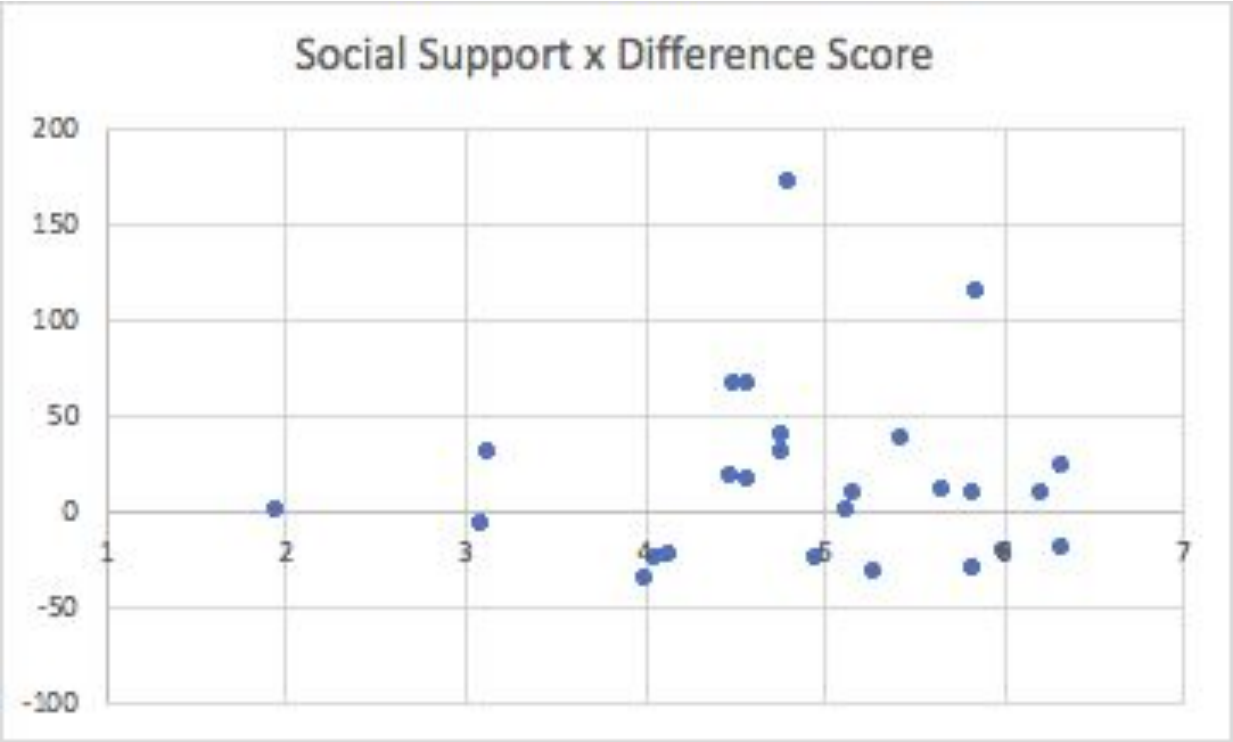
PSS-4 Stress x Diff Score



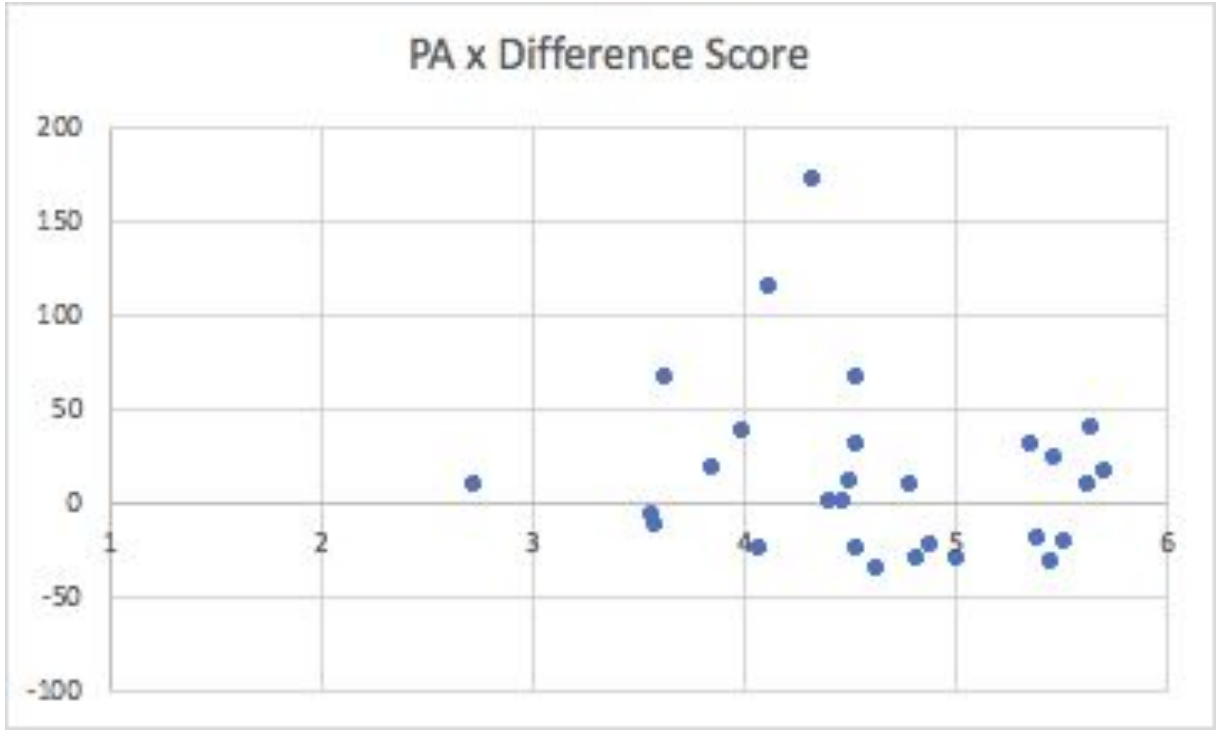
Parenting Self-Efficacy x Diff Score



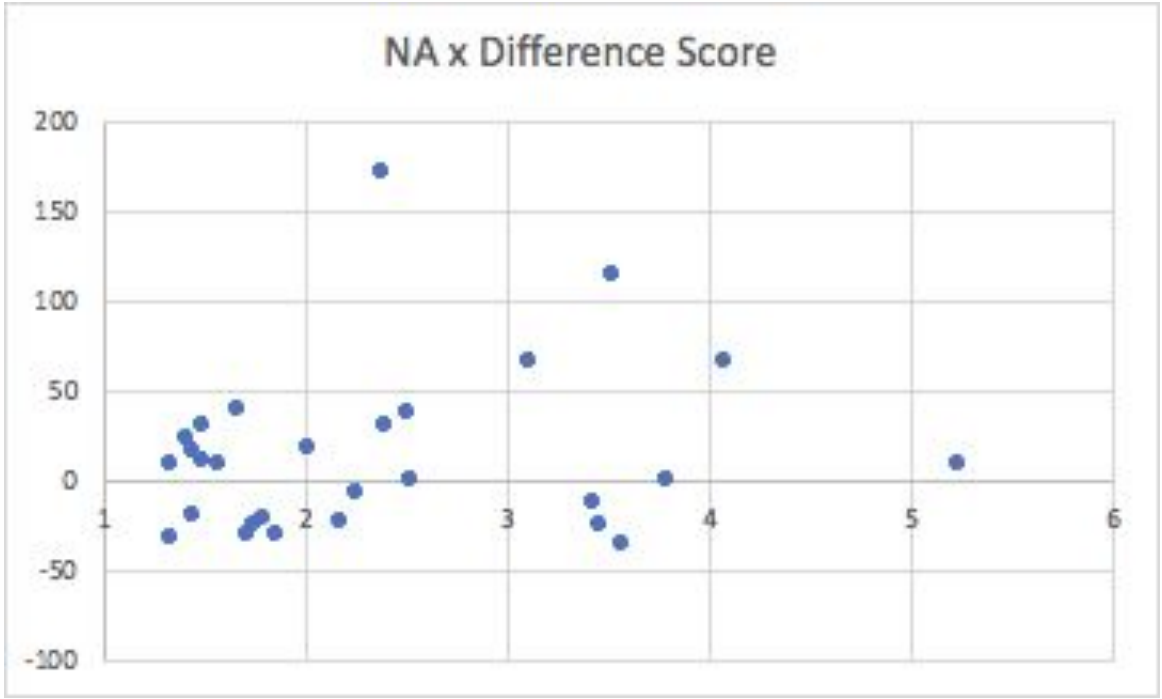
Social Support x Diff Score



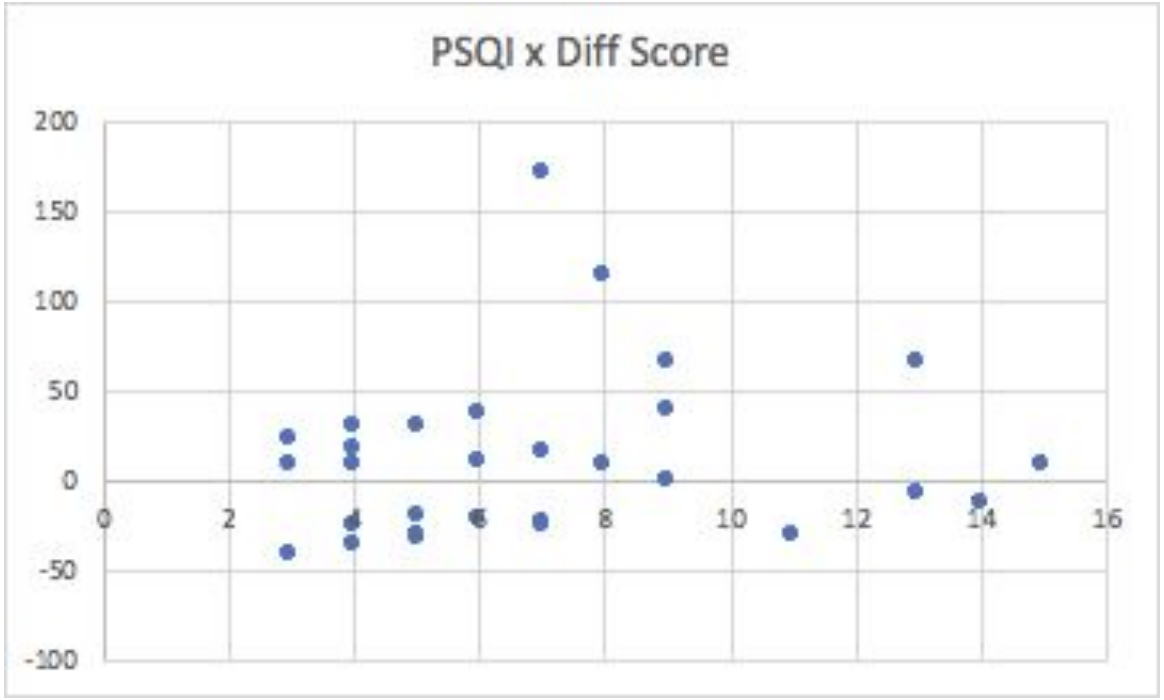
PA x Diff Score



NA x Diff Score



PSQI Sleep Quality x Diff Score



PSQI Sleep Quality x Infant Age (weeks)