Infant Temperament and Daily Cortisol in Three Cultural Samples

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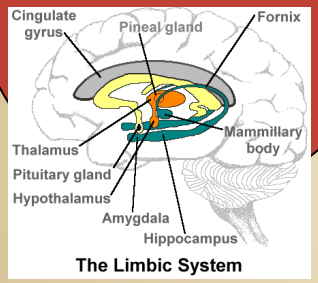
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The Hypothalamic-Pituitary-Adrenal Axis: Arousal for Action

Limbic System:



Hypothalamus

Corticotropin Releasing Hormone

+

Pituitary (anterior)

ACTH

+

Adrenal cortex

-

cortisol

Increase blood sugar, etc

epinephrine

Sympathetic nervous activity: Increase heart rate, etc

Infant Temperament and Cortisol: A Modest Literature

1. Cortisol response (DV) to (IV) challenge or stressor (experimental manipulation, medical procedure, natural transition); sometimes as mediated by temperament, or teacher or parent style.
2. Cortisol response as mediating variable for behavioral / mental health outcomes (depression, externalizing); sometimes temperament as IV.
3. Cortisol indicating temperament as outcome (DV) of (IV) biological factors (prenatal stress, postnatal maternal stress and breast-feeding).

=> Nothing on cortisol associated with temperament as component of normal daily life

Sample and Measures

Infant temperament: Infant Temperament Questionnaire – Revised (Rothbart & Garstein) at 6 months postpartum

Infant cortisol: from saliva, 4 / day, on two normal days at home, at 2 and again at 6 months postpartum; analyzed by Douglas Granger's lab.

Samples: broadly middle class, from

Korea (n=9) [Daejeon & Incheon]
Spain (n=6) [Seville]
U.S. (n=14) [Eastern Connecticut]

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n = 29

As *Necessity is the Mother of Invention*, so

Small n's are the Father of Desperate Measures

	2mos Morning	2mos Mid-day	2mos After-noon	2mos Ev'n-ing	6mos Morning	6mos Mid-day	6mos After-noon	6mos Ev'n-ing
Activity Level				+	+			
Distress to Limitations			+	+	+			
Fear				+	+			
Duration of Orienting								
Smiling and Laughter								
High Pleasure		+	-	-				
Low Pleasure			+	-	-			
Soothability					+			+
Falling Reactivity								
Cuddliness					-			
Perceptual Sensitivity				-		+		
Sadness			+	+	+			
Approach								
Vocal Reactivity								
Surgency/Extraversion								
Negative Emotionality			+	+	+			
Orientation/Regulation								

Findings

1. Infants who are rated at 6 months as high on **Negative Emotionality**, and **Activity Level**, as well as **low on Pleasure** (High & Low) tend to have **high cortisol** levels at both 2 and 6 months.

"The relation between the four-month profile of motor activity and crying to visual and auditory stimuli and later signs of fearful behavior … [is related to] low threshold in both the basal and central areas of the amygdala." (Kagan & Snidman, 1991).

Findings

1. Infants who are rated at 6 months as high on **Negative Emotionality**, and **Activity Level**, as well as **low on Pleasure** (High & Low) tend to have **high cortisol** levels at both 2 and 6 months.
2. This is evident in the afternoon and evening at 2 months of age, and in the morning at 6 months of age.

Diurnal pattern of cortisol established by 6 months.


So here’s the full story …

Correlates of "Difficulty" Ratings in Infancy and Early Childhood

Presented at OTC 2013

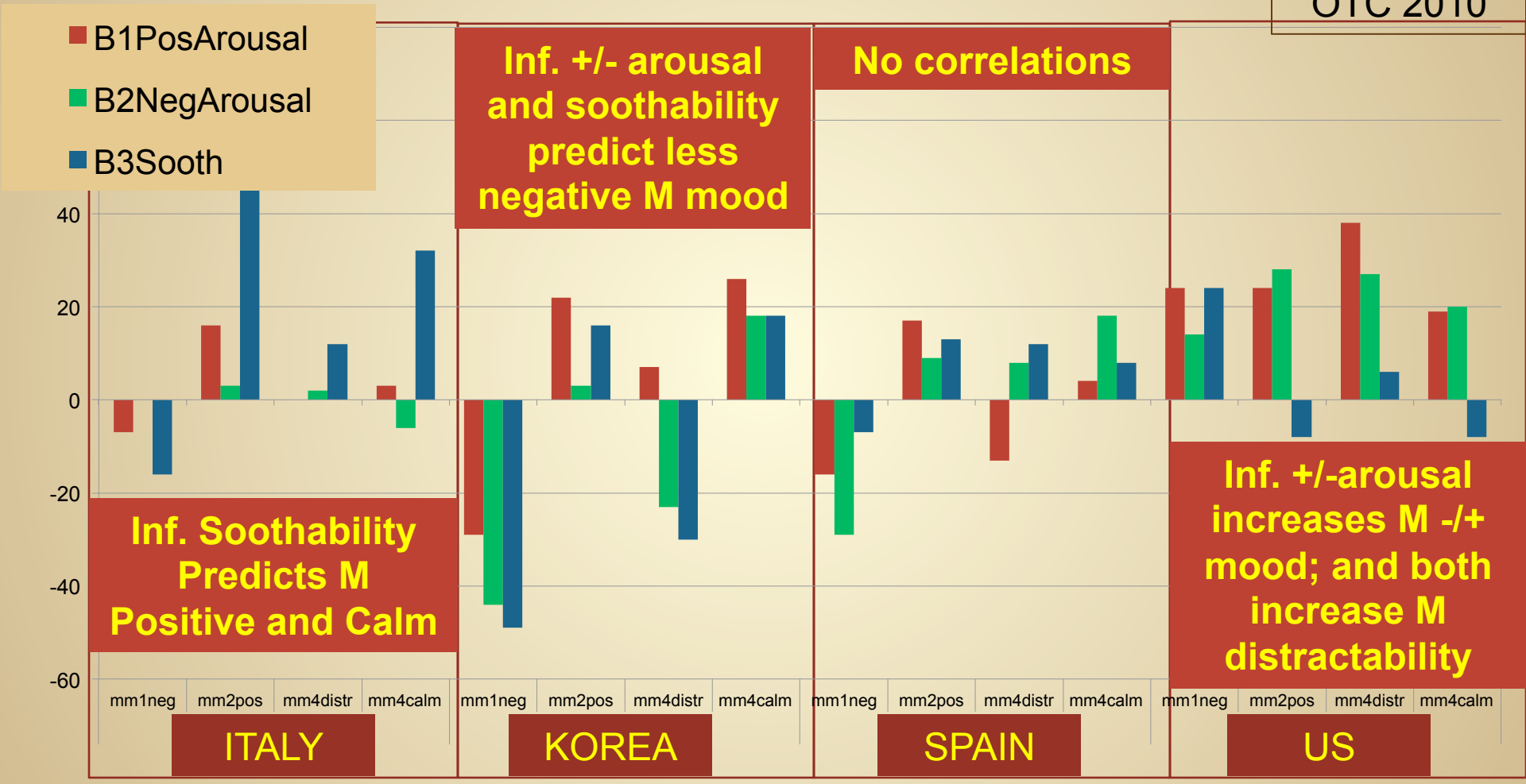
✔ = correlation (>=.30) X = no correlation

	IT	NL	PO	SP	SW	US
	6-18m 3-6y	6-18m 3-6y	6-18m 3-6y	6-18m 3-6y	6-18m 3-6y	6-18m 3-6y
Adaptability (low)	X✔	✔✔	✔✔	X✔	XX	✔✔
Approach (low)	✔✔	XX	✔X	XX	XX	✔X
Regularity (low)	XX	XX	XX	XX	XX	XX
Mood (negative)	XX	✔✔	✔✔	✔✔	✔✔	✔✔

"The Italian [results are]distinctive, reflecting the fact that only Adaptability and Approach are significantly related to Difficulty. Most striking … is the absence of Mood in the Difficult grouping." Super, C. M., Axia, G., Harkness, S., Welles-Nyström, B., Zylicz, P. O., Rios Bermudez, M., . . . McGurk, H. (2008). Culture, temperament, and the "difficult child" in seven Western cultures. *European Journal of Developmental Science., 2(1-2), 136-157.*

Mother's Mood is Related to Infant Temperament – But Differently in Different Cultures

Presented at OTC 2010



Conclusions

1. Maternal ratings of infant temperament can be validated with cortisol as a physiological indicator; this appears to be true in several cultures.
2. Common dimensions of infant temperament are reflected in the physiology of infants' daily functioning (not just in response to major challenges).
3. What is considered a "difficult" temperament varies from one cultural group to another.
4. The effects of infant temperament on maternal mood varies across cultures.