Maternal Sensitivity in Play, Distress, and Feeding Contexts: Factor Structure, Mean Differences, and Unique Correlates

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Introduction

- Maternal sensitivity has typically been viewed as a global trait.
- Recent arguments have been made for domain specificity (Grusec & Davidov, 2010). That is, parenting goals and behaviors, their antecedents, and their impact on relevant child outcomes may vary across developmental domains or contexts. Recent research supports this perspective (Leerkes et al, 2009; 2012; McElwain & Booth LaForce, 2006, Vliet et al., 2022, Teti et al., 2022).
- The goals of this study are to examine the extent to which maternal sensitivity in free play, distress-eliciting and feeding tasks (a) reflect a single construct or 3 context-specific constructs; (b) demonstrate mean differences; and (c) have similar versus unique antecedents/correlates.

Method

Participants: 299 mothers (47% non-White) and their infants (49% female).

Measures

During 3rd trimester, women self-reported

- **Socio-demographic status** = higher education, age, income to needs ratio and partner in the home
- **Emotional risk** = higher neuroticism, depressive symptoms, difficulties with emotion regulation, trait anxiety, and lower agreeableness and optimism

And viewed 4 video clips of crying infants and completed questionnaires after each to assess:

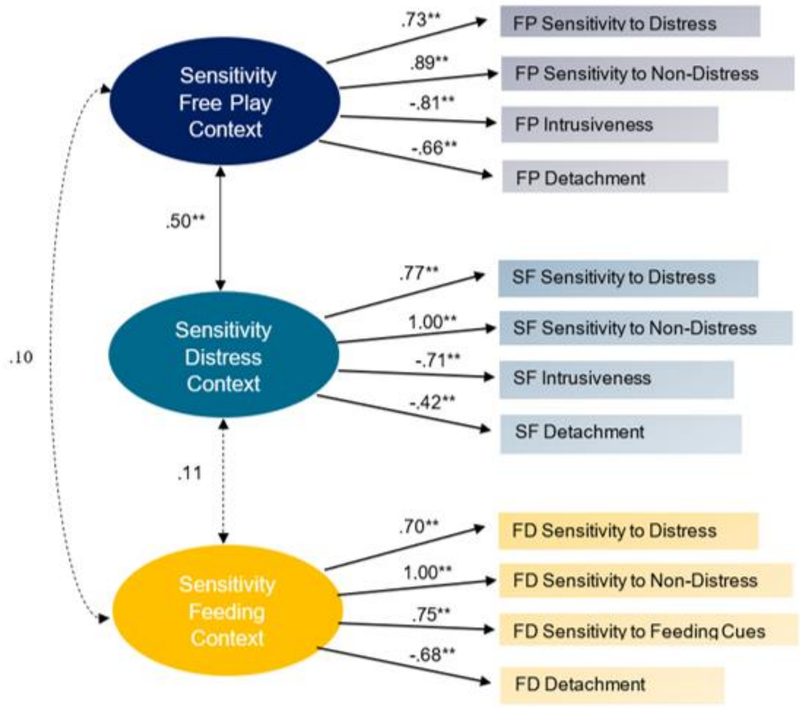
- **Infant-oriented cry processing** = higher accurate distress detection, empathy, sympathy, infant-oriented cry beliefs, and situational/emotional causal attributions
- **Mother-oriented cry processing** = frustration, anxiety, negative and self-focused beliefs about crying, and negative and emotion minimizing causal attributions about crying.

At two months postpartum, dyads were videotaped during

- **Free play** with age-appropriate toys
- **Distress task**–the still face re-engagement episode
- **Feeding** - 54% of mothers breastfed, 46% bottle-fed
- Maternal (sensitivity to distress and non-distress cues, intrusiveness, detachment) and infant behaviors (positive and negative mood) were rated on 7-point scales adapted from NICHD ECCRN (1999). *During the feeding task*, sensitivity to feeding cues (adapted from NCAST and Hodges et al., 2013) was coded which included intrusiveness/pressuring to eat.

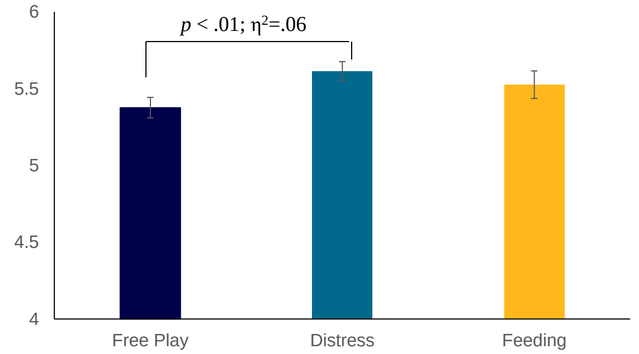
Results

Factor Structure

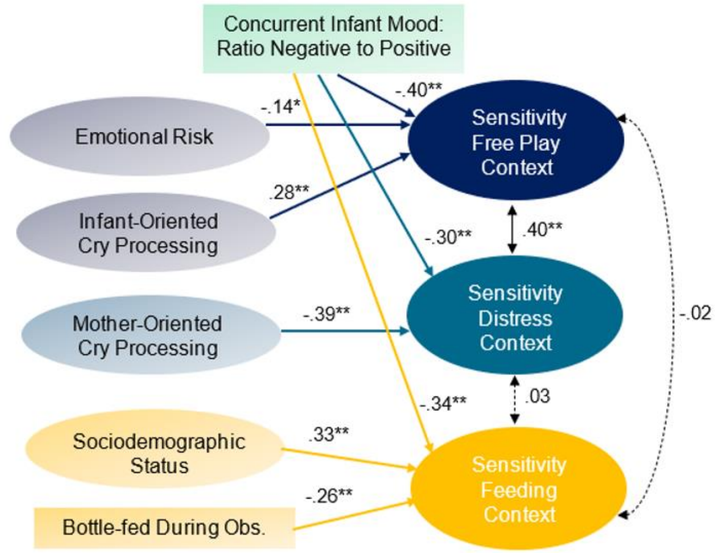


Confirmatory factor analysis indicated the 3-factor model fit the data well $\chi^2 = 125.838$, $df = 53$, $p < .001$, RMSEA = .077 with 90% CI [.060, .095], CFI = .931, SRMR = .062. and had significantly better fit (ΔCFI > .01, ΔRMSEA >.01) than the 1-factor model, which had a poor fit (CFI = .401, RMSEA = .227). Values are standardized coefficients. *$p \leq .05$, **$p \leq .01$. Dashed lines indicate nonsignificant pathways.

Mean Differences



Primarily Unique Antecedents/Correlates



Discussion

- Results support the domain/context specificity perspective in that 3 unique sensitivity factors emerged, and they had more unique than shared antecedents. The one commonality was that higher negative infant mood predicted lower sensitivity in all contexts.
- Sensitivity was significantly higher in the distress eliciting context than free-play. Perhaps infant distress elicited more responsiveness and mothers were able to maintain sensitivity given the brevity of the SF re-engagement episode. Contrary to prior research (Vliet et al., 2022), sensitivity was not lower during feeding likely because autonomy struggles related to eating are not apparent at 2 mos.
- To our knowledge this is the first study to examine sensitivity in these three contexts. Others have focused on distress and free play (McElwain & Booth La Force, 2006; Leerkes et al., 2009; 2012), bedtime and free play (Teti et al., 2022), and feeding and free play (Vliet et al., 2022). Additional research examining the magnitude of associations between sensitivity in each context and specific child outcomes is warranted. For instance, sensitivity in free play may be particularly important for language/school readiness, sensitivity in distress tasks for social emotional competence, and sensitivity during feeding for weight outcomes.

Acknowledgements: This research was supported by R01HD093662. The contents are the sole responsibility of the authors and do not necessarily reflect the views of the Eunice Kennedy Shriver National Institute for Child Health and Human Development. We are grateful to the participating families for their time and project staff for their dedication. Poster presented at SRCD, March 2023, Salt Lake City, Utah. Contact: emleerke@uncg.edu. Additional details: http://libres.uncg.edu/ir/uncg/f/E_Leerkes_Maternal_2023.pdf

This document provides additional analytic details to supplement the results reported in:

Leerkes, E.M., Chen, Y., Buehler, C., Shriver, L., & Wideman, L. (2023). Maternal sensitivity in play, distress, and feeding contexts: Factor structure, mean differences, and unique correlates. Poster submitted for possible presentation at the Biennial Meeting of the Society for Research in Child Development, Salt Lake City, UT, March 2023.

Variables reported below are described in the poster which is also available in the UNC Dataverse.

Aim2: Mean Differences (Bar chart in poster provides means and standard errors for sensitivity in each task)

Table 1: Repeated Measures ANOVA Results

	SS	*df*	*MS*	F	*p*
Sensitivity Task/Context	6.74	2	3.37	3.34	.036
Error	429.67	426	1.01		

Note: *$p < .05$, **$p < .01$.

Table 2: Standardized Loadings and Covariances for Measurement Model in Larger Model Addressing Aim 3: Unique vs Shared Antecedents

Construct	Indicator	β
Sensitivity Free Play	FP sensitivity to distress cues	.72**
	FP sensitivity to non-distress cues	.87**
	FP intrusiveness	-.82**
	FP detachment	-.67**
Sensitivity Distress Task	SF sensitivity to distress cues	.73**
	SF sensitivity to non-distress cues	1.00**
	SF intrusiveness	-.71**
	SF detachment	-.45**
Sensitivity Feeding Task	FD sensitivity to distress cues	.77**
	FD sensitivity to non-distress cues	.82**
	FD sensitivity to feeding cues	.91**
	FD detachment	-.46**
Covariances (method effects)		
FP sensitivity to distress cues with SF sensitivity to distress cues		.51**
FP intrusiveness with SF intrusiveness		.19*
SF detachment with SF sensitivity to distress cues		-.26**
SF detachment with SF intrusiveness		-.35**
FD detachment with FD sensitivity to non-distress cues		-.60**
Infant oriented cry processing P with mother oriented cry processing P		-.17**
Minimizing causal attributions P with negative causal attributions P		.23*
Infant oriented emotional reactions P with mother oriented emotional reactions P		.35**

Note: FP = free play, SF = still face re-engagement episode, FD = feeding. *$p < .05$, **$p < .01$. P = prenatal. *Infant oriented cry processing* = accurate distress detection, empathy, sympathy, infant-oriented cry beliefs, and situational/emotional causal attributions. *Mother oriented cry processing* = frustration, anxiety, negative and self-focused beliefs about crying, and negative and emotion minimizing causal attributions about crying. *Infant oriented emotional reactions* = empathy, and sympathy. *Mother oriented emotional reactions* = frustration, and anxiety.

Table 3: Coefficients Predicting Sensitivity in Each Task from Structural Equation Model Addressing Aim 3: Unique vs Shared Antecedents

Only significant paths were included in the related figure in the poster. This supplemental table includes all coefficients.

Predictors by Category	Free Play			Distress Task			Feeding Task		
Covariate	b	SE	β	b	SE	β	b	SE	β
Non-Hispanic White	.24	.12	.15*	.01	.12	.01	-.23	.18	-.10
Shared Variability Sensitivity									
Sensitivity Free Play 2M		NA		.17**	.05	.40**	-.03	.05	-.05
Sensitivity Distress 2M	.17**	.05	.40**		NA		.01	.06	.02
Sensitivity Feeding 2M	-.03	.05	-.05	.01	.06	.02		NA	
Traditional Broad Predictors									
Socio-Demographic Status P	.03	.03	.11	-.01	.03	-.02	.13**	.04	.33**
Emotional Risk P	-.26*	.13	-.14*	-.10	.14	-.05	.04	.19	.02
Infant Cry Specific Predictors									
Infant Oriented Cry Process. P	.64**	.21	.28**	.12	.19	.05	.12	.26	.04
Mother Oriented Cry Process. P	-.44	.24	-.16	-1.08**	.27	-.39**	-.27	.34	-.07
Feeding Related Predictors									
Bottle-fed 2M	.10	.11	.06	.06	.11	.04	-.60**	.16	-.26**
Concurrent Infant Behavior									
Ratio Infant Neg/Pos Mood 2M	-.21**	.04	-.40**	-.09**	.02	-.30**	-.46**	.09	-.34**
Total R2			***.40****			***.26****			***.34****

Note. $N = 299$. $\chi^2 = 1059.106$, $df = 512$, $p < .001$, $\chi^2/df = 2.069$, RMSEA = .060; 90% CI [.055, .065], CFI = .850, SRMR = .073. *$p < .05$, **$p < .01$; P = prenatal, 2M = 2 months postpartum. Indicators for latent variables as follows: *Socio-demographic status* = maternal age, education, partner in the home, income to needs ratio. *Emotional risk* = neuroticism, agreeableness (R), optimism (R), difficulties with emotion regulation, depressive symptoms, trait anxiety. *Infant oriented cry processing* = accurate distress detection, empathy, sympathy, infant-oriented cry beliefs, and situational/emotional causal attributions. *Mother oriented cry processing* = frustration, anxiety, negative and self-focused beliefs about crying, and negative and emotion minimizing causal attributions about crying. Manifest variables race, concurrent infant behaviors, and feeding mode.