Introduction & Hypotheses

- Effective functions (EF) consist of higher order cognitive processes, such as cognitive flexibility (i.e. attention shifting), inhibitory control, and updating/monitoring information in working memory3-5.
- Preliminary work suggests that aspects of maternal self-regulation, such as EF and effortful control, contribute to important aspects of caregiving behaviors3,6.
- Better maternal effortful control has been associated with more time spent interacting with infants3.
- Lower maternal working memory has been associated with greater overreactivity during parent-child interactions3, which may place children at greater risk for behavior problems3,7.
- The influence of maternal EF on caregiving behaviors in the context of high levels of infant distress has not been examined despite research indicating that caregiving aimed at reducing infant negative affect (NA) is crucial.
- Higher infant NA is associated with self-regulatory and behavioral difficulties later in life9,10.
- In the current study, a novel baby simulator (BSIM) paradigm was used to examine the contribution of maternal EF to specific soothing behaviors in the context of infant distress.
- It was expected that maternal caregivers with better EF would spend more time engaged in soothing behaviors than maternal caregivers with lower EF during interactions with the BSIM.

Method – Participants & Procedure

- At 4-months postpartum, 84 mothers participated in a lab visit.
- Mean age was 27.6 years (SD = 6.7).
- Most participants self-identified as Caucasian (69.9%), Hispanic/Latino (13.2%), or African-American (10.8%).
- 19.3 % reported income-to-needs ratios below the poverty level.
- All participants attended a 2.5 hour laboratory session.
- During the lab session, participants viewed several study measures, and then took part in the BSIM Paradigm at the end of the session.
- Participants were compensated with $50.00 for participating.

Method – Measures

- Three measures were used to assess three different EF constructs that are consistent with existing models of EF11:
  - Inhibitory Control – assessed with the D-KEFS Color-Word Interference Test11
  - Working Memory – assessed with the D-KEFS Verbal Fluency Test11
  - Attention Shifting – assessed using the computerized version of the Wisconsin Card Sorting Task12.
- Caregivers completed the Revised Dyadic Adjustment Scale13 and the Maternal Self-Efficacy Scale14.
- The following mother characteristics contributed to a cumulative risk index: teen mother, educational achievement below high school graduate, living at or below the poverty level, and a history of or a current depressive episode as determined by a clinical interview15.

Method - Baby Simulator Procedure

- Baby Simulator (BSIM) Paradigm
  - BSIM is a life-like simulated infant16.
  - An experimenter described the task using a standard script and demonstrated that soothing behavior successfully calmed the BSIM; after the demonstration, the BSIM was remotely reprogrammed to be inconsolable.
  - Participants attempted to soothe the BSIM using soothing behaviors as well as a variety of props, which were available for use during the task (e.g., toys, blankets, a bottle).
  - Interactions with the BSIM continued for up to six 255-second cycles of crying.
  - Participants were debriefed after the task.

Method – Behavioral Coding

- Using Noldus Observer XT software17, rAs continuously coded target behaviors, adapted from an existing coding scheme18:
  - Vocalizing: talking, chucking, or other soothing sounds (k = .65).
  - Caregiver: feeding, changing, or swaddling (k = .87).
  - Disturbing: presenting objects (e.g., toys) (k = .90).
  - Touching: patting/rubbing, tickling, or stroking (k = .67).
  - Bouncing, rocking, or swaying (k = .78).
  - Presenting face: holding the BSIM in a face-to-face position (k = .95).

Results

- Table 1: Hierarchical Multiple Regressions Analyses Predicting Soothing Behaviors with a Distressed, Simulated Infant.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Proportion of Time Presenting</th>
<th>Proportion of Time Rocking</th>
<th>Proportion of Time Vocalizing</th>
<th>Proportion of Time Caregiving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant Gender</td>
<td>0.03</td>
<td>0.02</td>
<td>0.09</td>
<td>0.00</td>
</tr>
<tr>
<td>Cumulative Risk</td>
<td>-0.26</td>
<td>-0.24</td>
<td>-0.33</td>
<td>-0.24</td>
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<tr>
<td>Maternal Self-Efficacy</td>
<td>-0.09</td>
<td>-0.16</td>
<td>-0.10</td>
<td>-0.01</td>
</tr>
<tr>
<td>Inhibition</td>
<td>0.10</td>
<td>0.12</td>
<td>0.12</td>
<td>0.13</td>
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<tr>
<td>Caregiver</td>
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<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Working Memory</td>
<td>0.06</td>
<td>0.07</td>
<td>0.07</td>
<td>0.06</td>
</tr>
</tbody>
</table>

Discussion

- The findings supported hypotheses; broadly, caregivers with better EF spent more time engaged in soothing behaviors while struggling to console the highly distressed BSIM.
- To our knowledge, this is the first study demonstrating the importance of maternal EF for caregiving behaviors in the face of high levels of infant distress.
- These findings link maternal EF to parenting behaviors that are important for the development of infant self-regulation/soothing early in life19.
- This study demonstrates the viability of using experimental, simulation procedures to study parent-infant interactions under conditions that would otherwise be difficult to study.
- This study also demonstrates the potential usefulness of the BSIM in parenting interventions and training in which parents can practice successful parenting behaviors toward simulated infant distress.

Future studies should:
- Include higher risk samples of mothers.
- Include a sample of fathers.
- Consider the role of problematic parent self-regulation in the efficacy of parenting interventions.

References


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To download a copy of this poster, please visit the Emotion Regulation & Behavior Lab website at www.niu.edu/emotionreg

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The Contributions of Maternal Executive Functions to Soothing Behavior during Interactions with a Distressed, Simulated Infant

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