Title: Receptive Language and Maternal Responsivity in Children with Down Syndrome and Cerebral Palsy

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Introduction: Maternal responsivity refers to how a mother reacts to and provides for her child. Maternal responsivity has a cumulative impact on a child’s cognitive, emotional, and language development. Responsivity is measured in different ways, including the molar level. Molar responsivity refers to a mother’s overall affect during interaction, and has been measured using rating scales that evaluate interactions in terms of positive affect, warmth, and flexibility. Children with Down syndrome (DS) experience delays in communication, which may impact a mother’s responsiveness. Children with cerebral palsy (CP) may experience obstacles to interaction due to physical dependence and speech difficulties, thus mothers engage in more physical contact than mothers of children with other disabilities. Children with CP may also have language delays. Previous work comparing molar responsivity of mothers of children with and without developmental disabilities found that mothers of children with disabilities displayed lower levels of positive affect and responsivity when compared to mothers of children with typical development (TD). This study builds on prior work by examining the influence of receptive language on molar responsivity in mothers of young children with DS and CP, compared to a group of same age children with TD and their mothers. Two research questions were addressed: (1) Are there differences in molar responsivity between groups of mothers of children with DS, CP and TD? (2) What is the relationship between child receptive language and maternal responsivity within each group?

Method: Sixty-two mother-child dyads participated (21 children with DS, 21 children with CP, and 20 children with TD). Children across groups were similar on chronological age (Mean age in months for DS = 42.57, CP = 35.90, and TD = 43.70) and ranged in age from 22 - 63 months. The Mullen Scales of Early Learning was used to assess receptive language in children with DS and TD. The Preschool Language Scale-4 or the Test of Auditory Comprehension of Language was used to assess receptive language in children with CP. Mean receptive language age equivalent scores in months for children with DS, CP and TD were 28.48(SD=11.24), 21.29(SD = 15.15), and 50.90(SD = 12.43) respectively. Thirteen of the 21 children with CP had severe motor impairment and were rated by the Gross Motor Classification System as Level IV or V, 2 were rated as Level III, 5 as Level II, and 1 as Level I. Two trained research assistants coded 10-minute videos of mother-child free play and rated maternal responsivity using molar codes according to Landry et al., (2001) across 4 subscales: positive affect, warmth, flexibility/responsiveness and physical control. Codes were on a scale ranging from 1 (low positive behavior) to 5 (high positive behavior). Intraclass correlations were found to be high at .92 across raters.

Results: Overall, mothers in each group showed largely positive affect, warmth, flexibility/responsiveness and low use of physical control. Positive affect mean scores for mothers of children with DS, CP and TD were 3.48(SD=1.44), 3.00(SD=1.38), and 3.80(SD=1.40) respectively. Flexibility/responsiveness mean scores for mothers of children with DS, CP and TD were 4.33(SD=0.58), 4.33(SD=0.58) and 4.30(SD=0.57) respectively. Warmth mean scores for mothers of children with DS, CP and TD were 4.52(SD = 0.51), 4.24(SD = 0.54) and 4.10(SD =0.31) respectively. Physical control mean scores for mothers of children with DS and TD were both 5, indicating no use of physical control; mothers of children with CP had a mean score of 4.62(SD=0.74). There were no significant differences in measures of maternal responsivity between groups of mothers of children with CP, DS, and TD on measures of positive affect and flexibility/responsiveness. Significant differences were found for warmth ($F_{(2, 59)} = 4.42, p = .016$) and physical control ($F_{(2, 59)} = 5.43, p = .007$). Mothers of children with DS showed slightly greater warmth than mothers of children with TD (mean difference = 0.42). Mothers of children with CP used more physical control during play than mothers of children with DS and TD (mean difference between CP and both DS and TD= 0.38) to support their children due to gross motor limitations. Additionally for children with CP, as language comprehension decreased, maternal warmth significantly increased ($r_s = -.57, p = .007$); and a significant positive correlation was found between receptive language and physical control ($r_s = .46, p = .035$). No significant correlations were found between receptive language and maternal responsivity for children with DS or TD.

Discussion: This study indicates that mothers of young children with DS and CP have largely positive interaction styles that are similar to those of their TD peers. A comparison of these groups reveals that mothers of children with DS and CP are showing greater warmth during interactions by expressing interest, praise, and affection more often than mothers of children with TD, and mothers of children with DS are using even more warmth than what we see in mothers of children with TD. Greater warmth shown by mothers of children with DS may provide encouragement for continued language and communication development for their children who largely have delays in receptive language. Receptive language in children with CP was found to be negatively related to maternal warmth and positively related to physical control. These findings suggest that in children with CP who have
lower receptive language, mothers are providing positive input to encourage development by increasing sensitivity to their child’s communication and nonverbal cues during play. Additionally, mothers of children with CP are providing greater physical support during interactions, but this did not reduce their ability to provide the same amount of warmth and positive affect that mothers of children with TD provided.

References/Citations: