**Introduction**

Do children born moderate-to-late preterm (32–36 weeks gestation) show differences in the development of hot and cold executive function at preschool age?

Moderate-to-late preterm children are at higher risk than their full-term peers for exhibiting attention and behavior regulation problems. • *School age, children born moderate-to-late preterm have more cognitive and emotional regulation difficulties, a slightly lower IQ, and increased rates of attention and behavioral problems.* (S. van Steen et al., 2006)

Moderate-to-late preterm birth also has a negative impact on academic achievement. • *Poor academic achievement and attention regulation skills in this population may be related to atypical executive function development.*

Children born preterm, including those born moderate-to-late preterm, may be at risk for executive dysfunction. • *Executive function refers to cognitive processes that are associated with regulation and control, including working memory, inhibitory control, and cognitive flexibility (set-shifting).*

Very preterm children (<28 weeks gestation) and/or very low birth weight children show significant executive dysfunction as compared with their normal birth weight counterparts (Adleman et al., 2006). Recent studies indicate that moderate-to-late preterm children also exhibit disruptive EF development (Anderson et al., 2004).

Prior studies of executive function (EF) development in preterm children have primarily assessed EF in affectively neutral contexts (cool EF), while disruptions in motivational or emotionally significant contexts (hot EF) have not been investigated. • *The current study examines the development of both hot and cold EF in low-risk, healthy children born moderate-to-late preterm in comparison to full-term peers at preschool age.*

**Participants**

All children were screened for significant prenatal or birth complications, developmental or neurological disorders, and vision or hearing impairments.

**Methods**

**Cold Executive Function**

- **Spatial Working Memory**: Children recalled and tagged a sequence of locations that increased in length in both forward and reverse order. Highest span length for forward and backward trials was recorded.

- **Inhibitory Control**: Children played a computer game where they pressed the space bar for a frequent target character and were required to inhibit responding when a rare non-target appeared. Accuracy and reaction time for correct trials were recorded.

**Hot Executive Function**

- **Maudsley Index of Delay Aversion (MIDA)**: Children played a computer game where they made decisions to earn 1 point following a 2 second delay, or 2 points following a 3 second delay. Percentage of delayed choices was recorded.

**Results: Cold Executive Function**

- **No group differences existed between PT and FT children on the Inhibitory control task.**

**Results: Hot Executive Function**

- **No group differences existed between PT and FT children on the MIDA task.**

**Conclusion**

Moderate-to-late preterm children display differences in both hot and cold EF development at preschool age.

Like very preterm children, children born moderate-to-late preterm also show atypical EF development. • *Developmental differences in EF for moderate-to-late preterm children are more subtle (in comparison to effects observed in very PT samples), are not present on all EF tasks, and are not universally reflected in parental report.*

• *Because this study was not longitudinal in nature, it is unclear whether these deficits persist beyond the preschool age range, a time of rapid EF development in children.*

To our knowledge, this is the first study to report differences in hot EF development following preterm birth.

• *Differences in hot EF development are of particular interest given its relation to real world outcomes in typically developing children (e.g. relationship between delay of gratification task performance and college academic achievement).*

• *Further characterization of hot EF in PT children will be necessary to understand whether hot EF difficulties may account for increased rates of behavioral, emotional, and school problems in this population.*

Our results argue for increased monitoring of long-term neurodevelopmental outcomes, including both hot and cold EF, in children born at 32-36 weeks gestation.