Interaction of Neonatal Pain-Related Stress and Regional Brain Cortical Thickness Associated With Executive Function in Children Born Very Preterm At 8 Years.

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OBJECTIVE
To evaluate whether neonatal pain-related stress and cortical thickness together predict performance in executive functions at school-age in children born very preterm

RESULTS
After adjusting for neonatal clinical factors (GA, SNAP-II day 1, infection, number of surgeries, cumulative morphine exposure) and WISC IV Verbal Comprehension Composite score (Verbal IQ), the relationship is shown for the left lingual cortex, and was the same for:

- Left superior parietal, right superior frontal, right superior temporal (after adjustment for multiple comparisons)
- Left & right rostral middle frontal, right inferior temporal, left caudal middle frontal, left & right inferior prefrontal, left & right rostral inferior frontal

In very preterm children with no severe neonatal brain injury and/or major sensory/motor/developmental impairments, after adjusting for clinical confounders and Verbal IQ:

- Combination of fewer skin breaking procedures and thinner cortex predicted better Flanker % correct
- In children with thicker cortex, exposure to more skin breaking procedures predicted poorer Flanker % correct
- Same relationship was found in eight brain regions related to EFs

CONCLUSIONS
- Our findings suggest that executive function performance in very preterm children is dependent on both neonatal pain/stress exposure and cortical thickness
- The relationship these factors have to executive function performance cannot be understood by examining them individually

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