Supplemental Material for: **Abnormal sensory reactivity in preterm infants during the first year correlates with adverse neurodevelopmental outcomes at 2 years of age**

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Developmental Assessment of Young Children

In our cohort, 68 participants were evaluated during one of their follow-up visits at 4-12 months corrected age using the Developmental Assessment of Young Children (DAYC) cognitive, communication and motor domains.[1] Median corrected age at DAYC evaluations was 8 months, (IQR = 4.8-9.0).

Table 1. Developmental testing scores

	N	Median (IQR)
DAYC scores at 12 months	69	
Cognitive		107 (97,115)
Motor		99 (95,104)
Communication		104 (98,110)

IQR: Interquartile range (25%, 75th)

Separate Kruskal-Wallis tests were used to determine if the TSFI domains were associated with the cognitive, motor, and communication DAYC scores.

Associations between sensory reactivity and concurrent DAYC scores

Abnormal ocular-motor control was associated with lower DAYC motor scores ($p = 0.007$). This association was explained by the association between WMI and abnormal ocular-motor control ($p = 0.3$ after adjusting for WMI). Abnormal adaptive motor function scores were associated with lower DAYC communication scores (p =

0.002). No significant associations with DAYC cognitive and motor scores were noted.

After conducting the main analysis, we accounted for the potential impact of minor neurosensory impairments in infancy on concurrent outcomes. In particular, we examined whether the analysis of associations between visual-tactile integration and ocular-motor control with perinatal factors was modified by the presence of a visual impairment. We also examined whether the association between perinatal characteristics and vestibular stimulation reactivity was modified by hearing impairments. We conducted 27 sensitivity analyses and compared these results to the previous analyses. The results indicated no discernible changes in the interpretation.

Voress JK, Maddox T. Developmental assessment of young children (DAYC). Austin, 1998.

Cranial Ultrasound protocol

Cranial ultrasounds were performed on resting infants without sedation, using a Siemens S2000 instrument. Each study begins using the vector transducer, operating at a frequency of 6-10MHz, depending on the size of the baby (typically 10 MHz in the most preterm infants). This transducer does automatic electronic coronal and sagittal sweeps of the entire brain through the anterior fontanelle. We performed three coronal sweeps to image as much of the brain under the bilateral parietal convexities as possible: one at the midline, one angled to the right, and one angled to the left.

These sweep images were followed by images of the posterior horns of the bilateral ventricles through the mastoid fontanelle, and images of the cerebellum in the posterior fossa, typically from both the right and left approaches, unless the infant could not be moved. Subsequently, we used a trapezoidal transducer, which consists of linear technology that widens distally to obtain a set of coronal and sagittal images. This transducer operates at frequencies ranging between 6 and 9 MHZ, again using the highest frequencies in the smallest premature infants. We ensured that the entire brain was included in all coronal and sagittal images, with equal focus throughout and with uniformity throughout the imaging plane.

Magnetic Resonance Imaging protocol:

Infants were scanned in the Vanderbilt pediatric radiology facility using a 3T Phillips Achieva magnet and 8 channel head coil. Infants were swaddled and fed prior to scans and were not sedated. The following protocol was performed in all infants:

1. Sagittal T1 (TR: 590 ms, TE: 15 ms, Slice thickness: 3 mm with gap of 1mm)
2. Axial diffusion with ADC map (TR: 5428 ms, TE: 103 ms, Slice thickness: 3 mm with gap of 1mm)
3. Axial T2 (TR: 4334 ms, TE: 110 ms, Slice thickness: 3mm with gap of 0.8 mm)
4. Axial T1 (TR: 603 ms, TE: 12 ms, Slice thickness: 3mm with gap of 0.8 mm)
5. Coronal T2 (TR: 4373 ms, TE: 100 ms, Slice thickness: 3mm with gap of 0.8 mm)
6. Axial Gradient (FFE) (TR: 963 ms, TE: 23 ms, Slice thickness: 3mm with gap of 0.8 mm)