

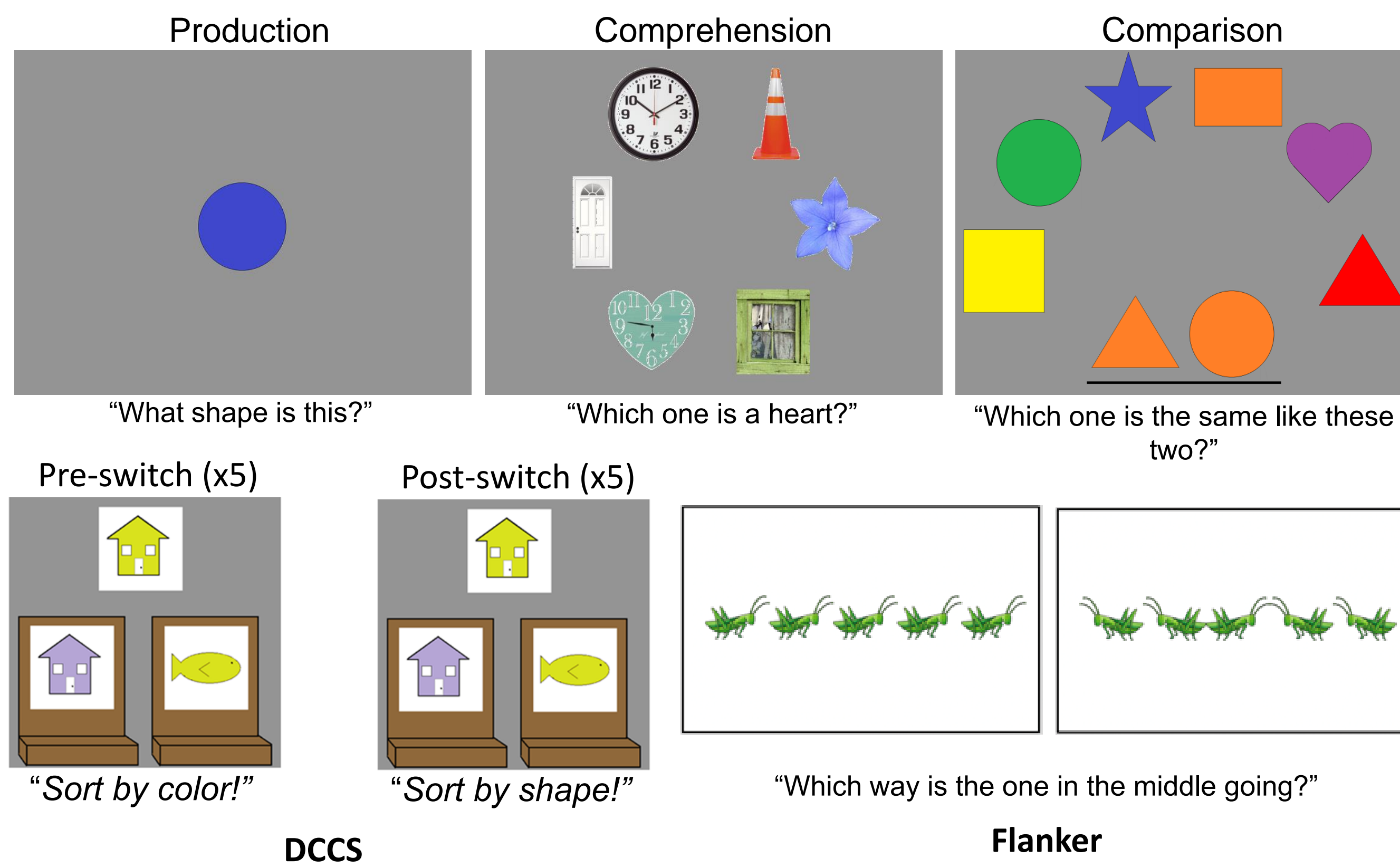
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Introduction

In this project, we examined whether dimensional label learning (DLL) predicts subsequent dimensional attention development. Previous research suggests that DLL involves mapping dimensional labels (i.e. color/shape) to featural labels (i.e. red/square), and featural labels to properties of objects (Sandhofer & Smith, 1999; Verdine et al. 2016). We used an fNIRS probe to measure hemodynamic activity from left frontal and bilateral temporal-parietal regions previously implicated in dimensional attention (Morton et al., 2010; Buss & Spencer, 2018) while participants completed a battery of dimensional labeling (DL) tasks at 2.5 years of age. At 3.5 years of age, children completed the DL tasks, Flanker, and DCCS. Activation during the DL tasks at 2.5 was associated with later behavioral performance at 3.5 years of age in the DCCS, but not with the Flanker. Activation during the DL tasks at 3.5 years, however, was associated with both Flanker and DCCS performance.

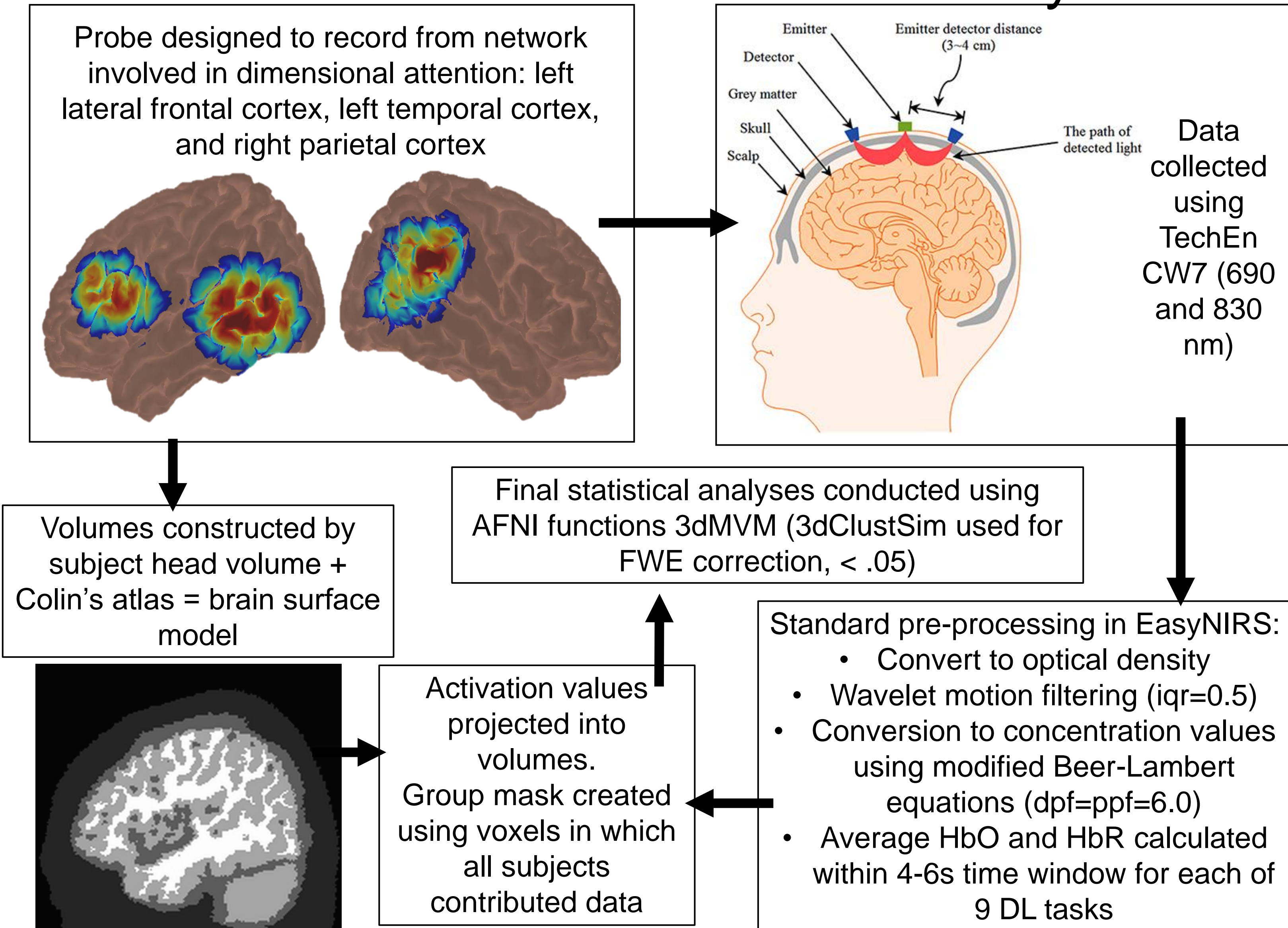
Tasks and Stimuli

Examples of Tasks

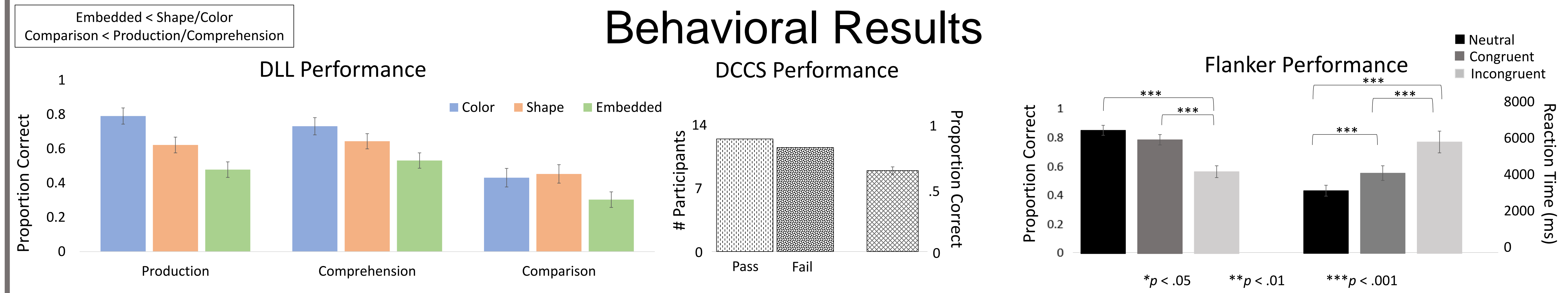


- Twenty-five 33-month-old children
- 2nd session at 45 months
- Stimuli were composed of shapes, colors, or embedded shapes
- Three task types (production, comprehension, and comparison).
- Color/Shape Production/Comp rehension, DCCS and Flanker given at second testing session

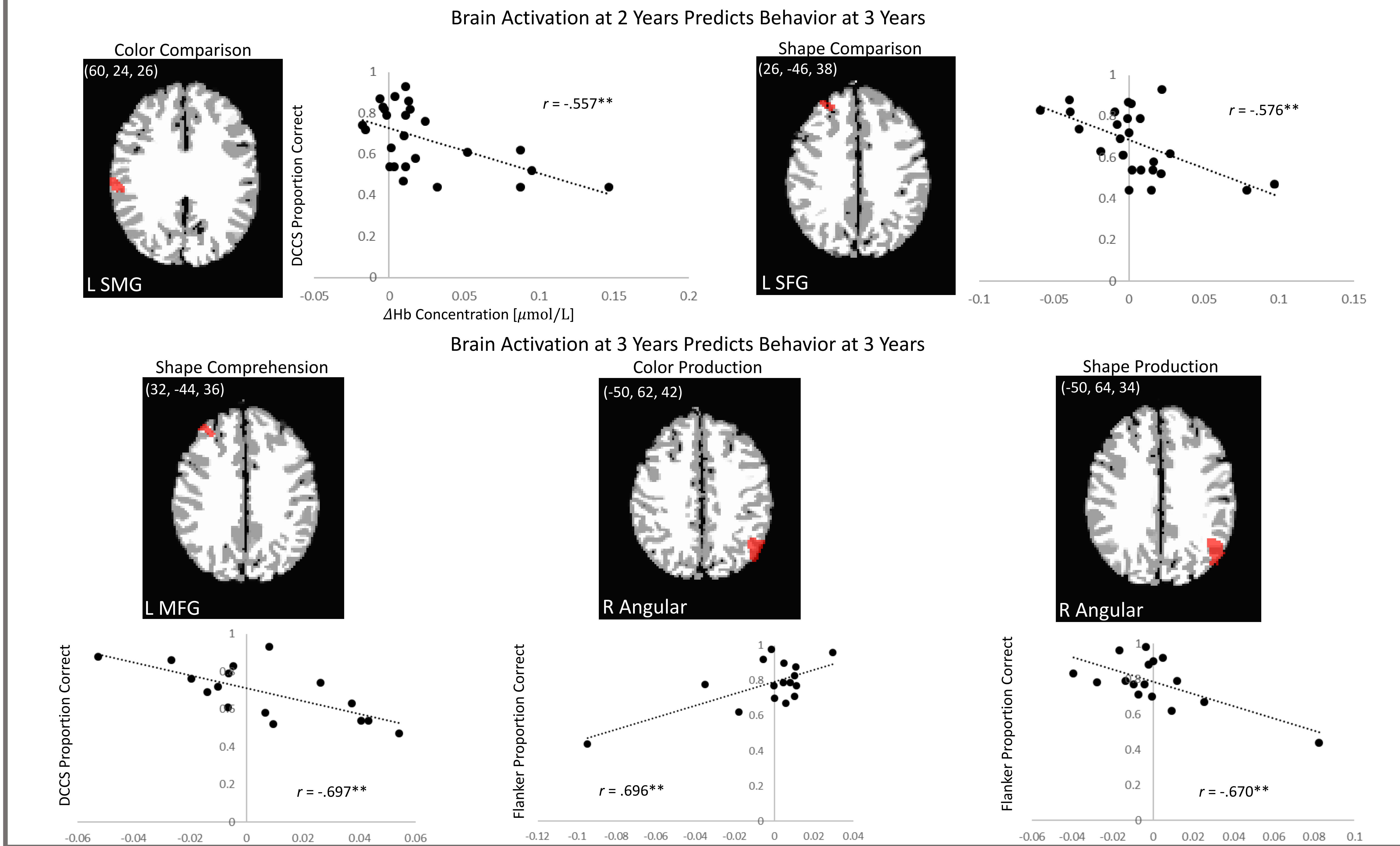
fNIRS Data Collection and Analyses



Behavioral Results



Results



Conclusions

- Brain activation in the DL tasks at 2 years was associated with DCCS performance at 3 years, suggesting that DLL provides a basis for dimensional attention development.
- The Flanker (which does not recruit dimensional attention) was not associated with DL activation at 2 years.
- Brain activation in the DL tasks at 3 years was associated with both Flanker and DCCS performance
- Future research will examine how DL given as an intervention influences later dimensional attention

References

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- Sandhofer, C. M., & Smith, L. B. (1999). Learning color words involves learning a system of mappings. *Developmental Psychology*, 35(3), 668-79.
- J. Bruce Morton, Rachael Bosma, Daniel Ansari (2010). Age-related changes in brain activation associated with dimensional shifts of attention: An fMRI study. *NeuroImage*, 46(1), 249-256.
- Verdine, B. N., Lucca, K. R., Golinkoff, R. M., Hirsh-Pasek, K., & Newcombe, N. S. (2016). The Shape of Things: The Origin of Young Children's Knowledge of the Names and Properties of Geometric Forms. *Journal of Cognition and Development*, 17(1), 142-161.