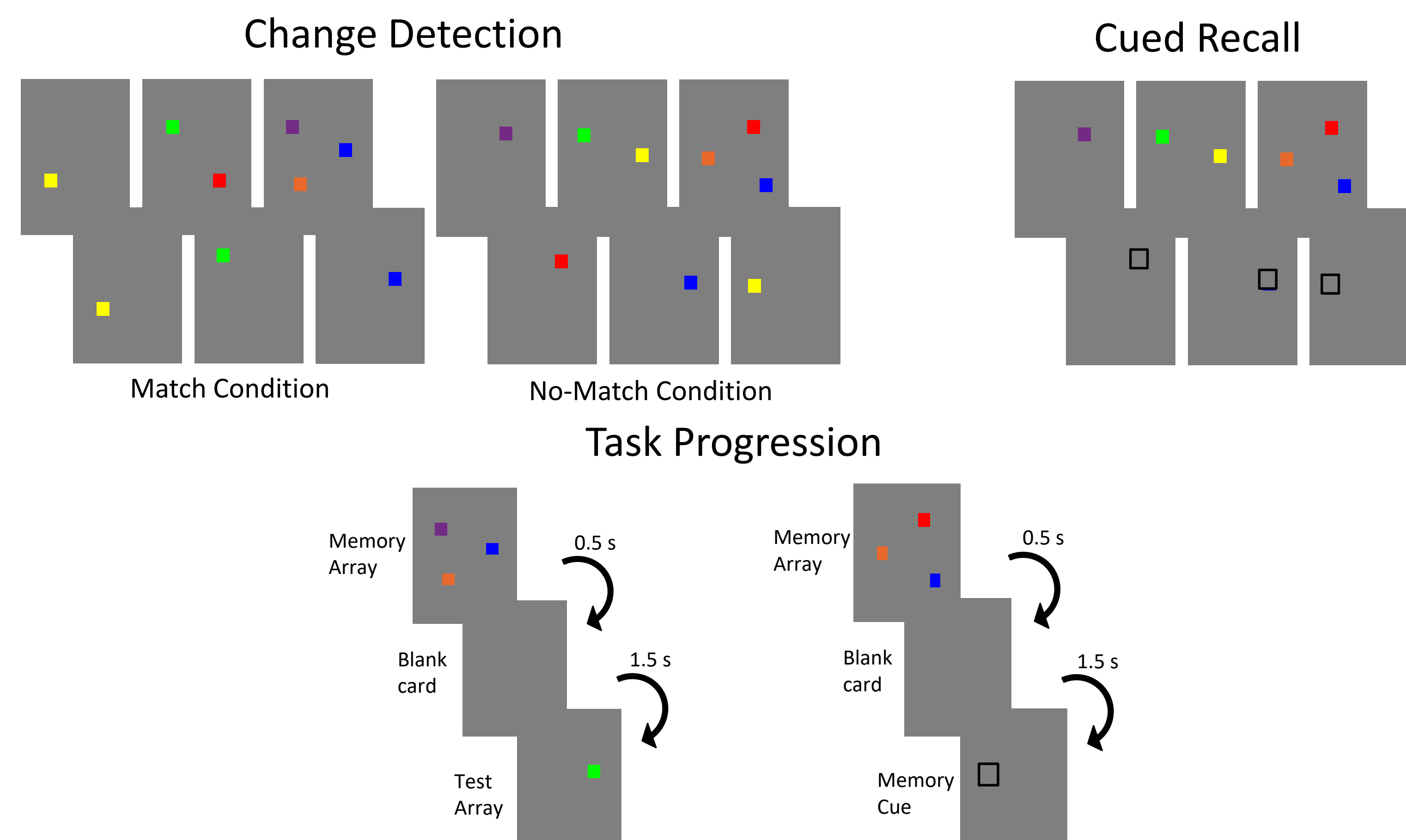


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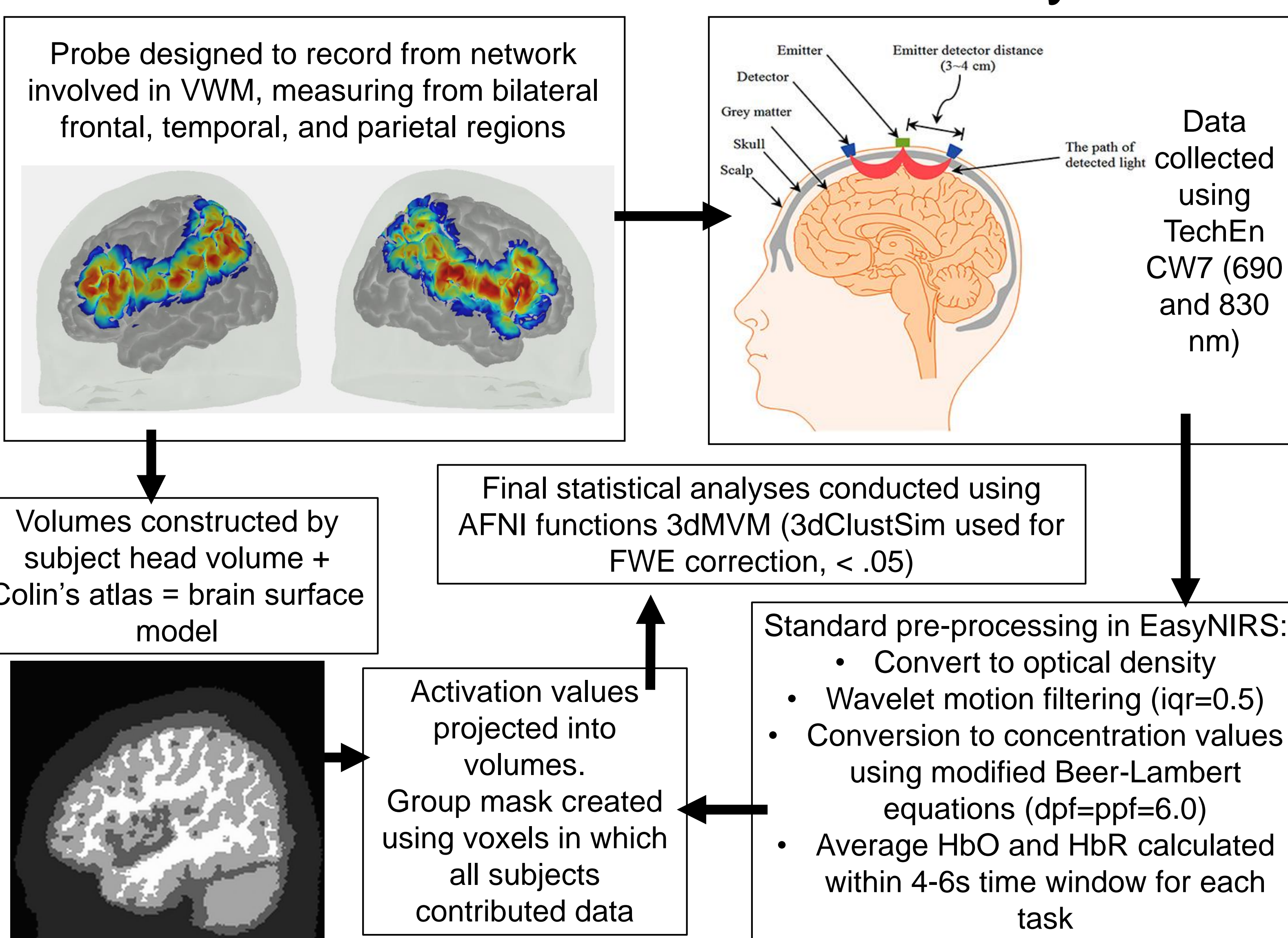
Introduction

Visual working memory (VWM) allows us to hold visual information in mind to be manipulated for a task. Previous research shows that performance varies based on factors such as stimulus modality and number of distractors. This study aimed to explore the effects of response type on VWM performance in 4.5- and 5.5-year-olds. A single-item probe color change detection and a cued recall with labeling task were administered. Neural data were collected using functional near-infrared spectroscopy. Both tasks used set-sizes 1-3 and six canonical colors (red, orange, yellow, green, blue, purple). All children were given the tasks in a fixed order, with the change detection task first. Behavioral analyses show that children's performance declined as set-size increased in both tasks ($F(2,11)=65.438, p<0.001$). This effect was more pronounced in cued recall than in change detection ($F(2,11)=7.769, p=0.003$). Moreover, VWM capacity was estimated to be higher in the change detection task ($k=2.53$) compared to the cued recall task ($k=1.24$) ($p<0.001$). When we look at the neural data, both tasks activated bilateral temporal and parietal cortices. The change detection task also elicited activation in bilateral frontal cortex. Though both tasks required the same working memory processes, distinct neural regions were involved based on the response type. Lastly, increases in activation over set-size, a key signature of VWM, was only observed in the change detection task, suggesting that this pattern of activation may be an artifact of response type rather than an actual signature of working memory.

Tasks and Stimuli



fNIRS Data Collection and Analyses



Results

Behavioral Analyses

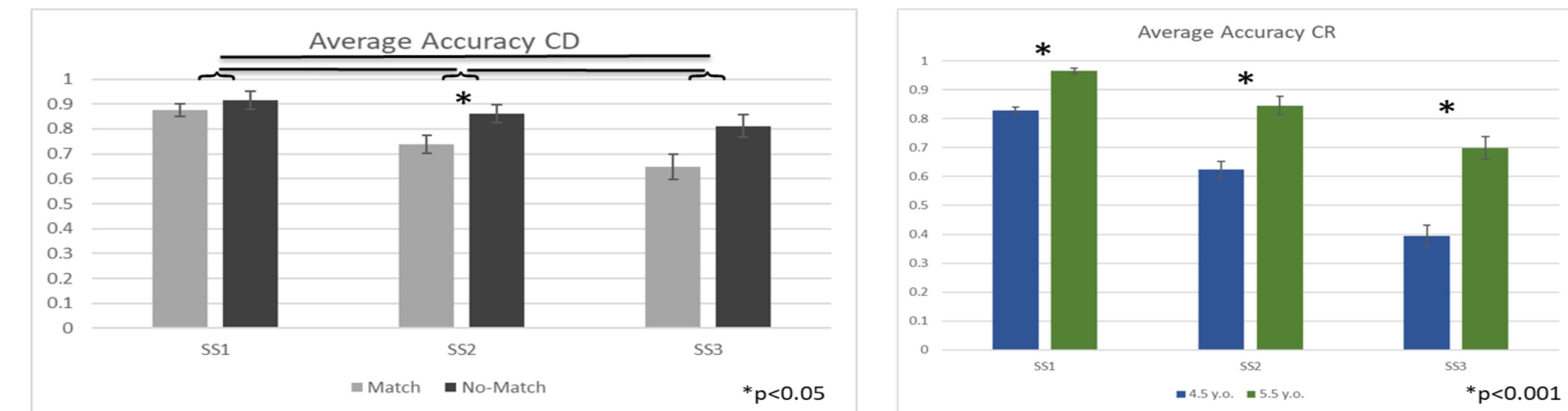
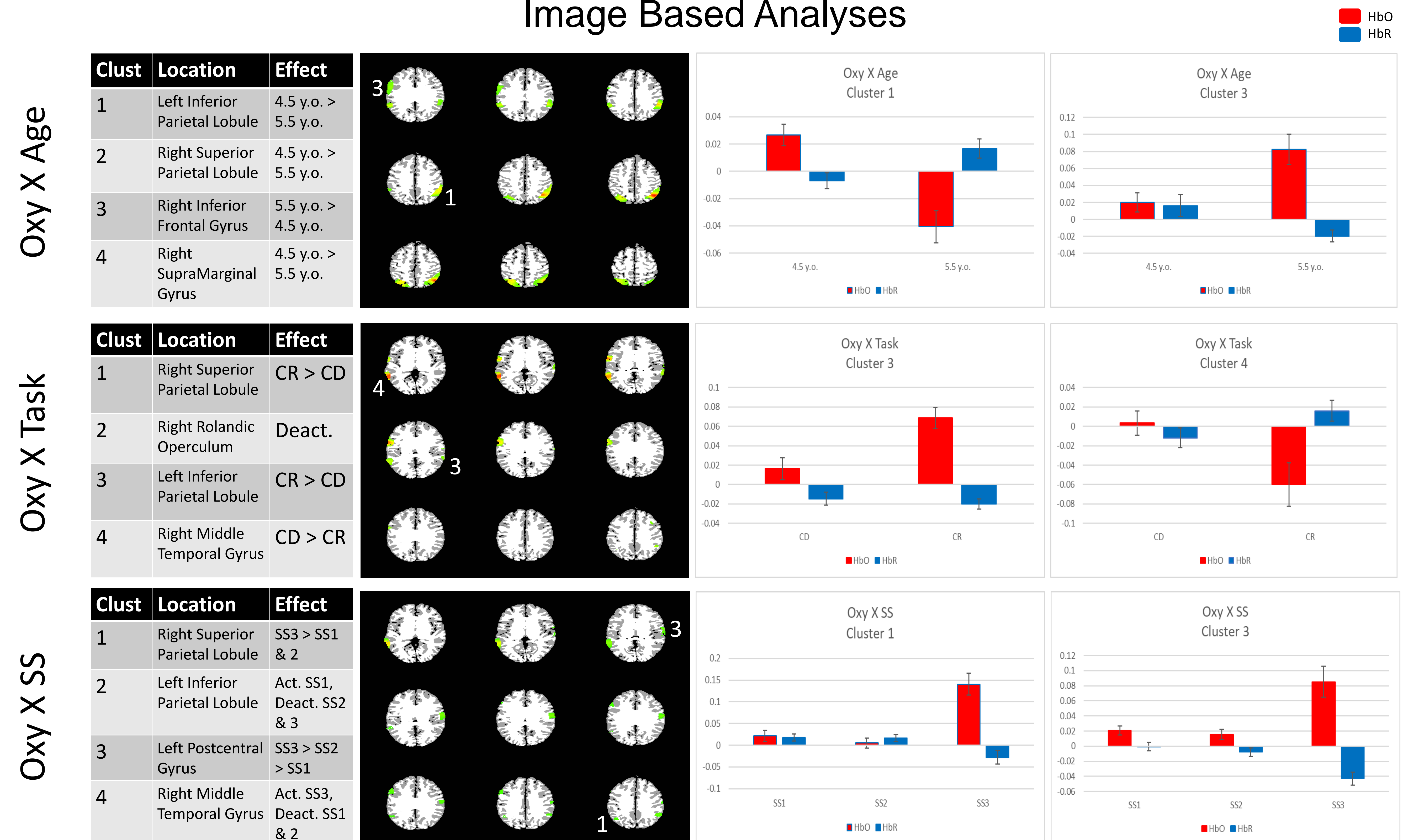


Image Based Analyses



Conclusions

- So far, we are seeing age effects in both behavioral and neural data suggesting that there is a developmental shift occurring during this time period.
 - Need to look further into age effects, specifically between tasks to see if the response difference is affecting performance and neural signatures.
- Set-size effect was only observed for Change Detection. The set-size effect might be an artifact of response type rather than an actual signature of working memory.
- Data collection is on-going and the full data set is needed for complete analyses in order to examine associations between performance and activation.

References

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