

Integration of Brain Imaging and Neurobehavioral Cores

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CIFASD Steering Committee Meeting

January 13-14, 2005



Neurobehavioral Cluster

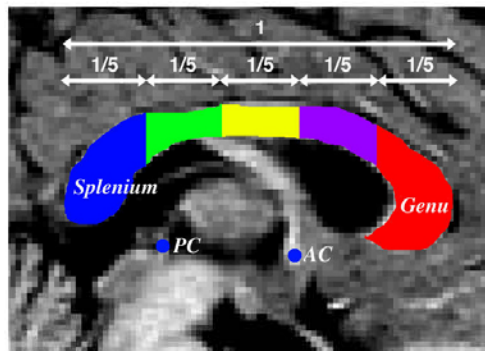
- Comprises the neurobehavioral and neuroimaging cores
- Seeks to integrate data from the two cores to further the aims of the consortium
- Requires consistent data collection across sites
- Once collected, data will be analyzed using existing statistical tools and possibly new analytic techniques



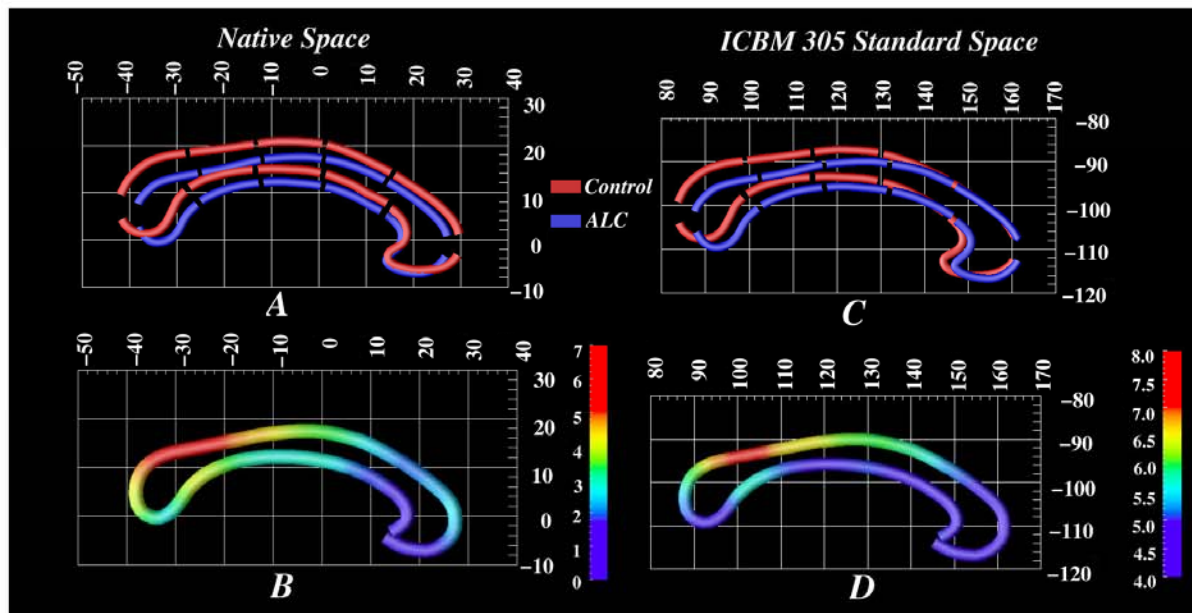
Analysis Techniques

- Correlational Techniques, e.g.,
 - Corpus Callosum: finger localization & verbal learning
 - Cerebellar vermis: attention & verbal learning
- Point-by-point statistical analyses of brain morphology
 - e.g., gray/white matter density (& behavioral scores)

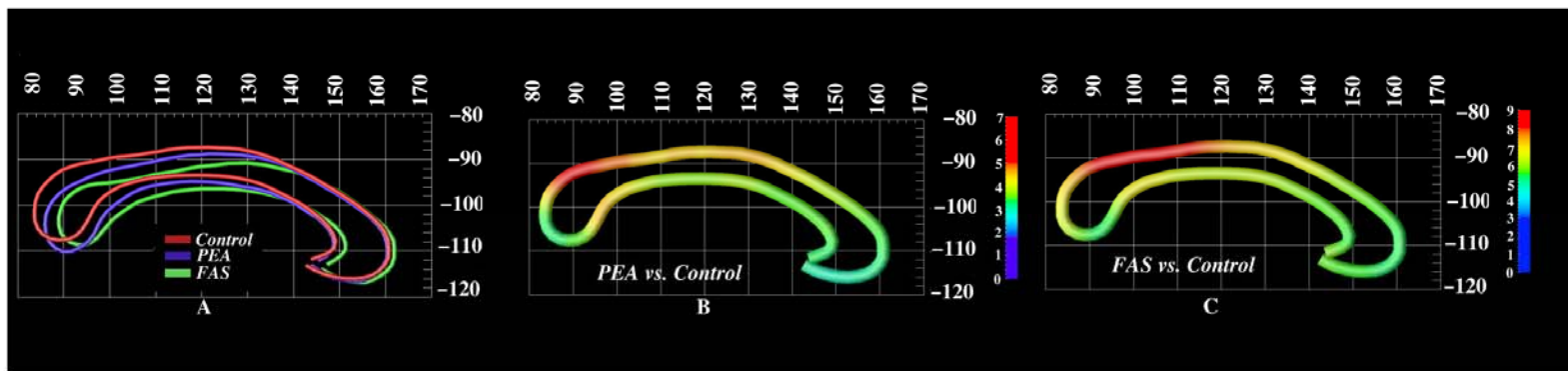




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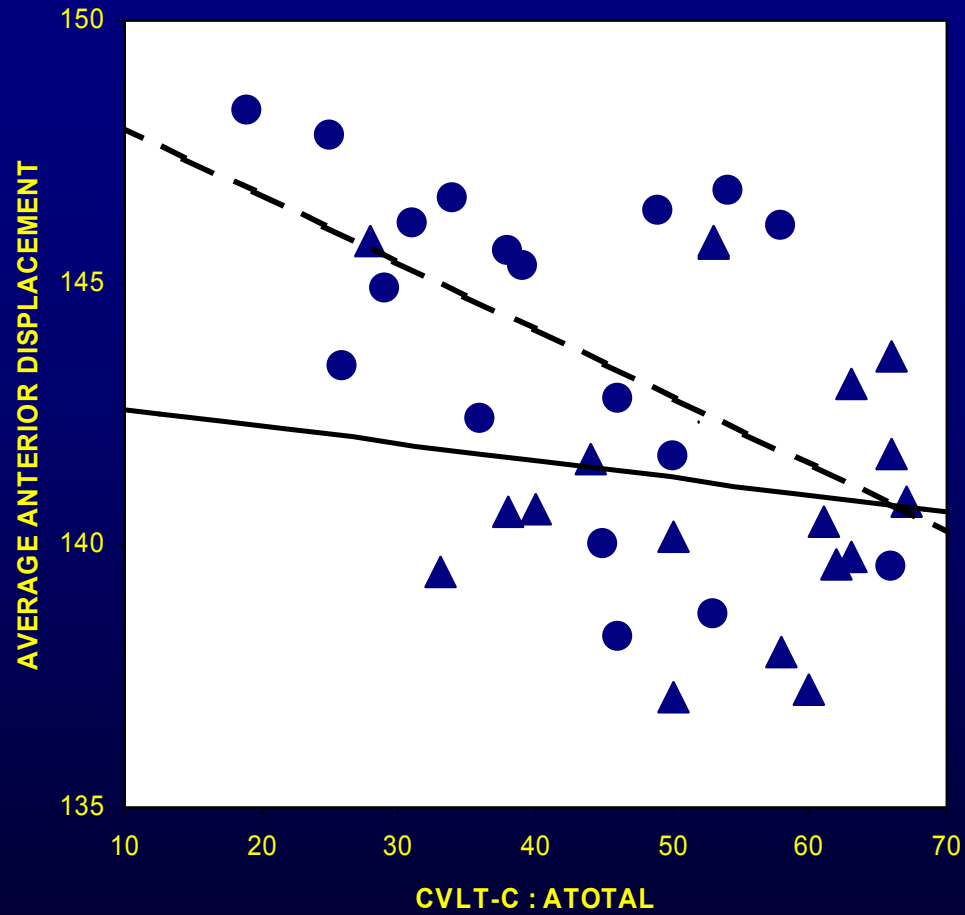


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Sowell et al., (2001), *Neurology*



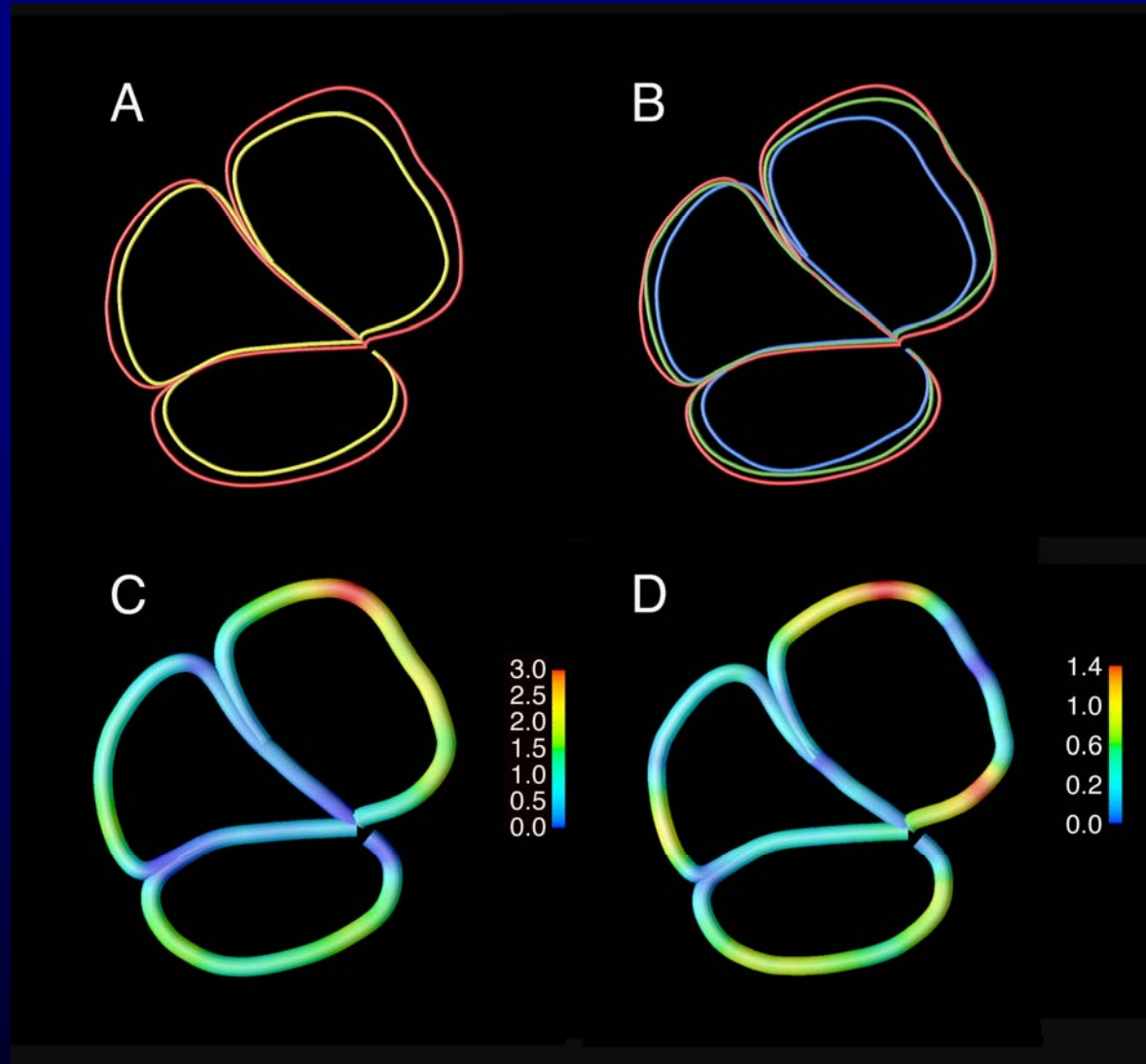
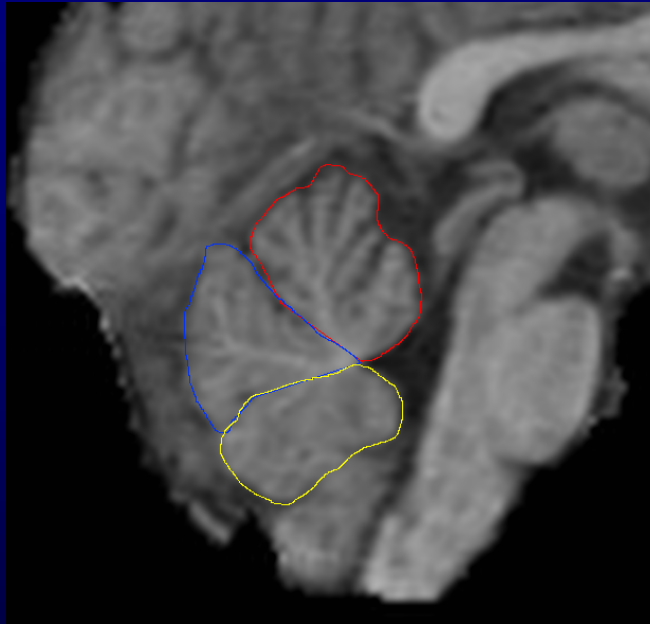
Finger Localization Correlates with CC Area

Task	Corpus Callosum Region					
	1	2	3	4	5	Total
CUD-visual	.47	.35	.10	.25	.12	.24
CUD-1	.59**	.43	.03	.44	.21	.45
CUD-2	.41	.50*	.11	.51*	.69**	.56*
FSIQ	.07	.09	.02	.14	.31	.02



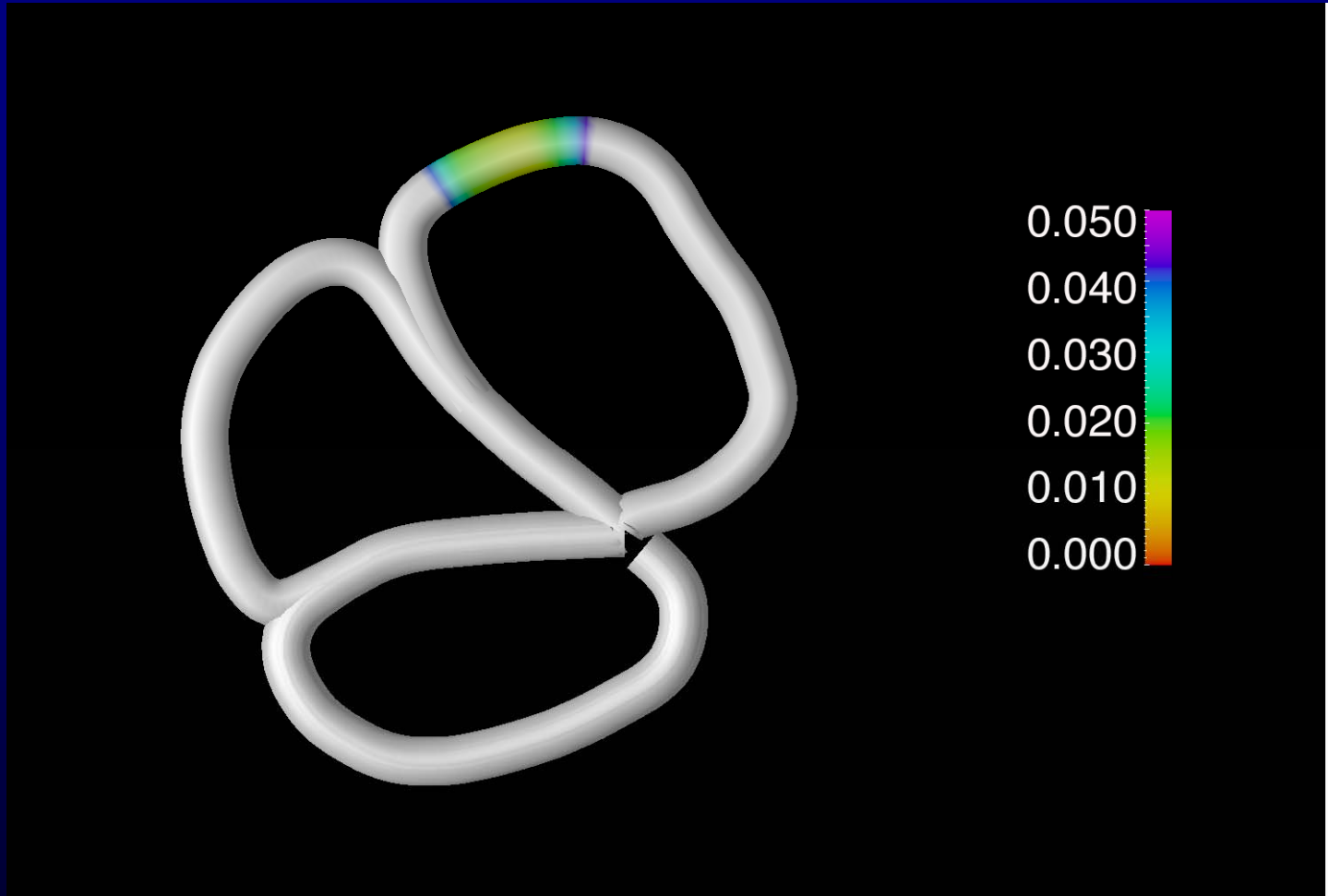
* $p < .09$; ** $p < .05$





Mapping Cerebellar Vermal Morphology and Cognitive Correlates in Prenatal Alcohol Exposure
(O'Hare et al., 2005, *Submitted*)

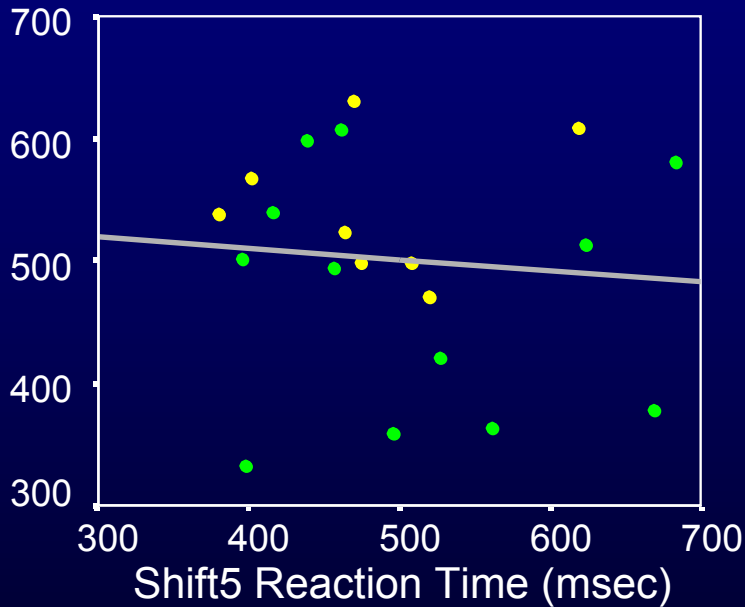




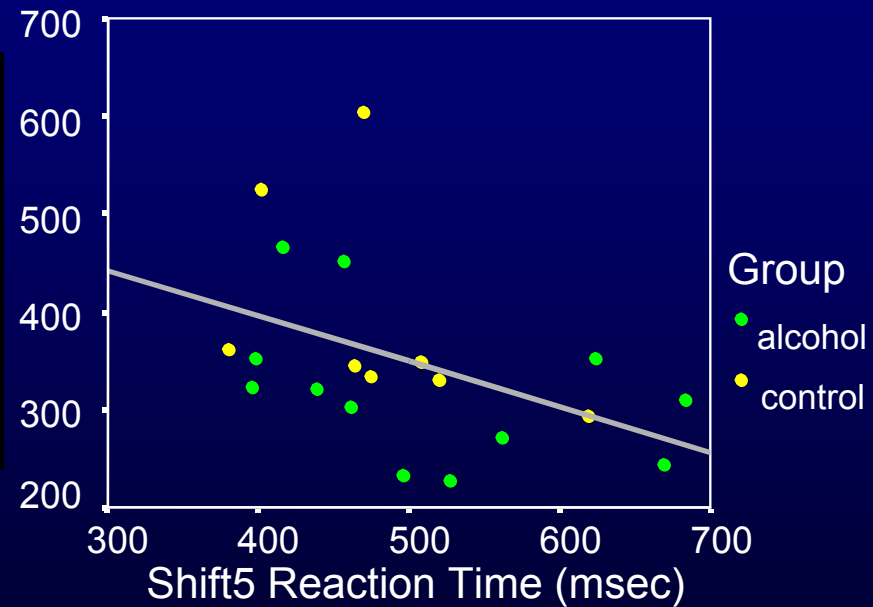
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Correlations of Shifting with Cerebellar Vermis Area



$Rsq = 0.0085$



$Rsq = 0.1958$



Techniques from Other Samples

- Normally developing children
 - Relationship between changes in gray matter thickness change & improved abilities on a test of general verbal intellectual functioning
 - Relationship between cortical thickness change in left inferior frontal cortex & phonological awareness
- ADHD
 - Relationship between frontal lobe dysmorphology & hyperactivity



Gray Matter Thickness Change Correlated with Change in Vocabulary Score

ROI Permutation

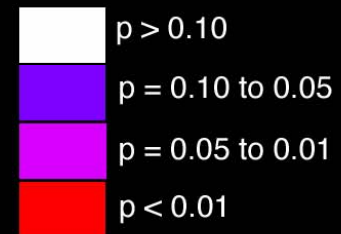
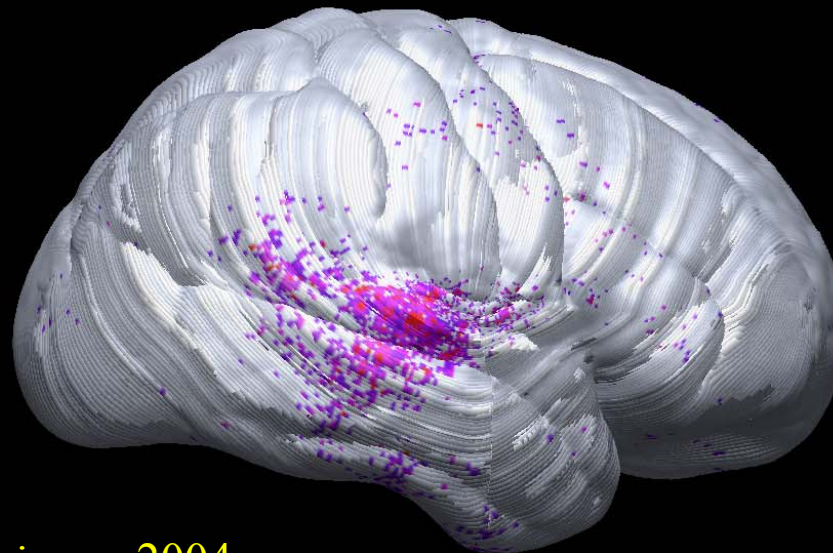
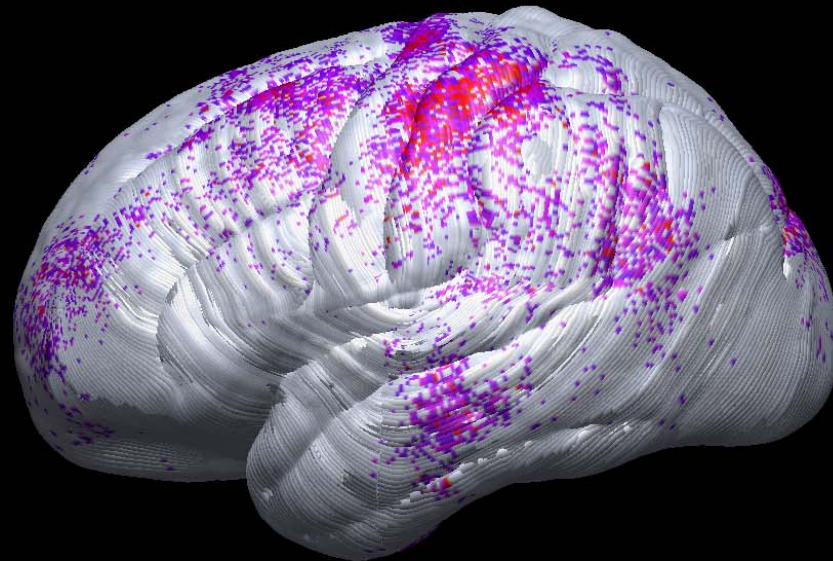
Analyses:

Left Dorsal Frontal

$p = 0.045$

Left Parietal

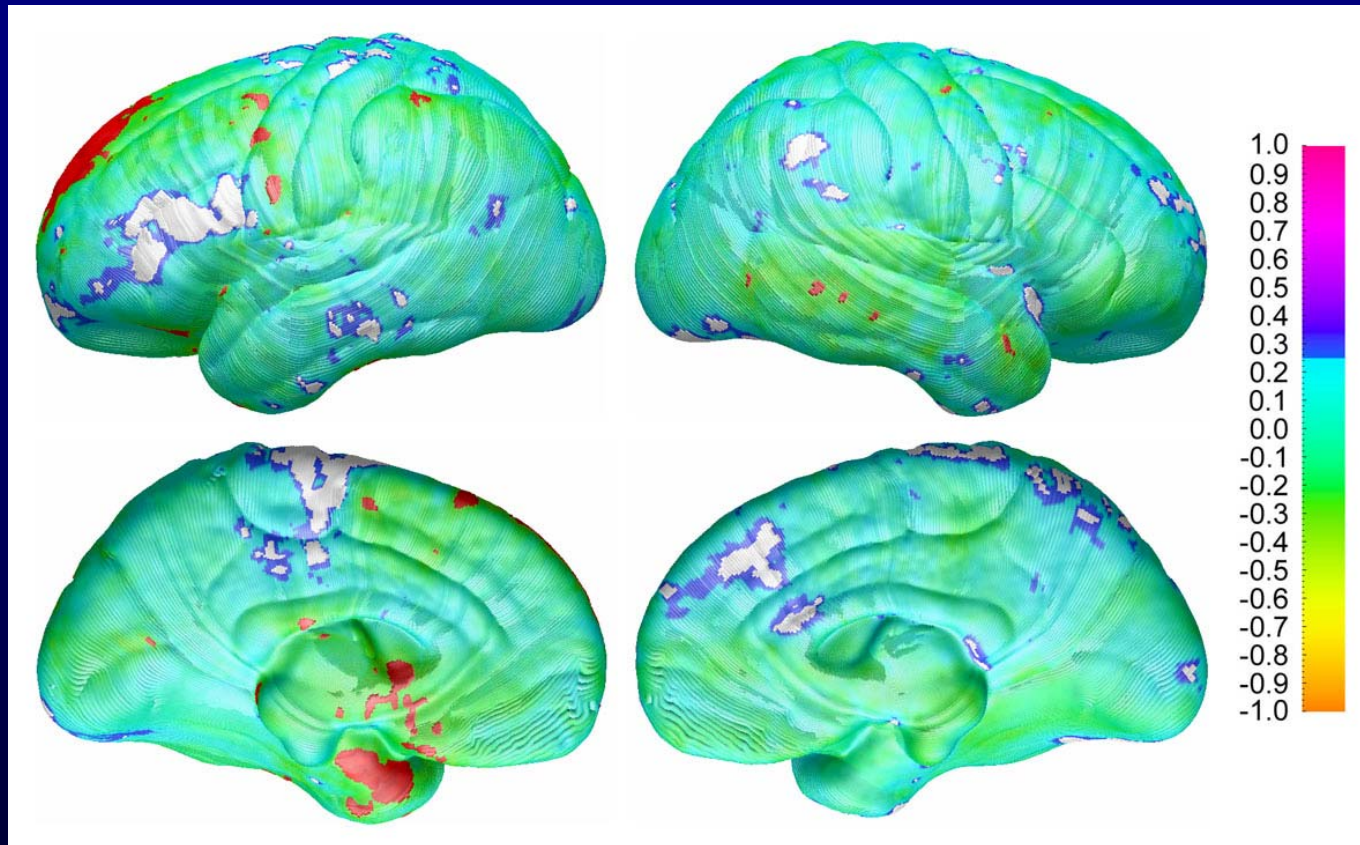
$p = 0.030$



Negative Correlations



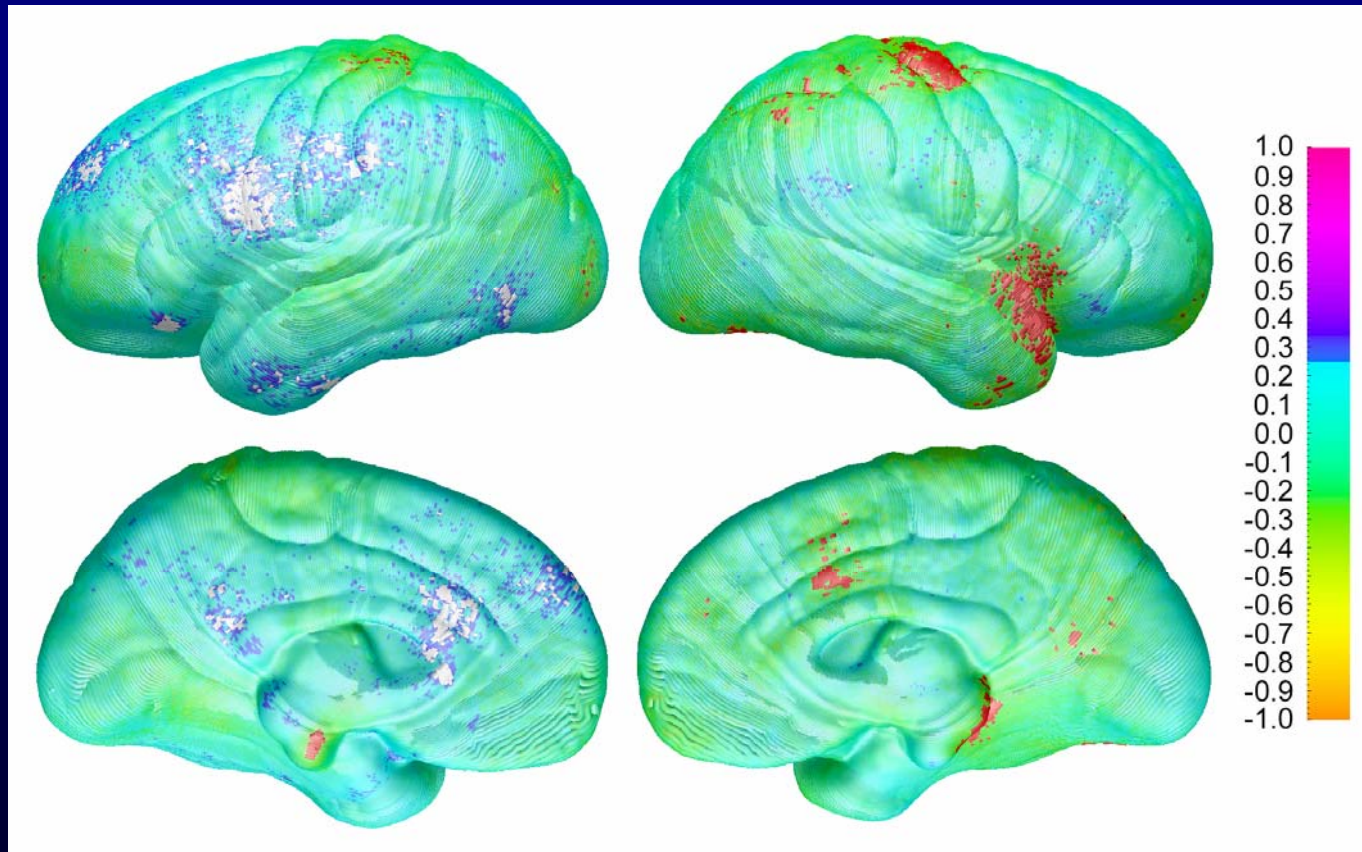
Within Subjects Analysis of **Brain Growth** and Phonological Processing



Mapping structural brain changes related to improving phonological awareness in normal children
(Lu et al., 2005, *Submitted*)



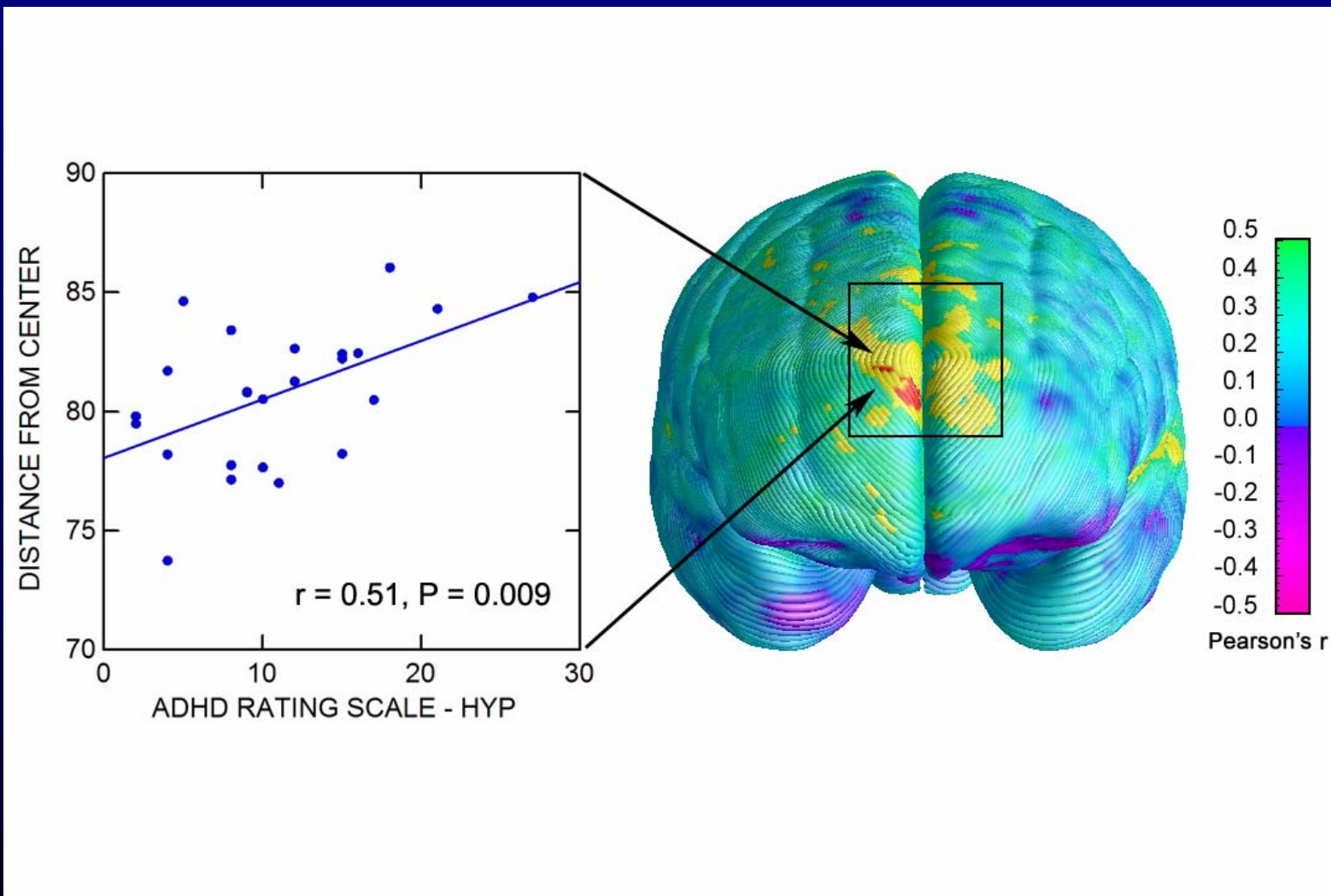
Within Subjects Analysis of **Cortical Thickness Change** and Phonological Processing



Mapping structural brain changes related to improving phonological awareness in normal children
(Lu et al., 2005, *Submitted*)



Correlations Between Brain Size and Hyperactivity in ADHD



Sowell et al., *Lancet*, 2003



Possible Questions

- Relationship between lateralized gray matter density and (verbal) test scores
- Relationship between vermal dysmorphology and tests of attention (verbal learning)
- Relationship between frontal lobe dysmorphology and scores on hyperactivity rating scales
- SD: Relationship between CC morphology and interhemispheric tasks

