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fMRI: Methods and Applications



Brock Kirwan

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MRI Research Facility Uses:

- Structure
- Functional MRI (fMRI)
- Diffusion Tensor Imaging (DTI)
- Arterial Spin Labeling (ASL)

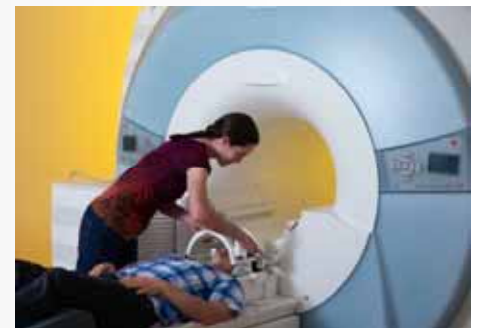
fMRI: Methods and Applications

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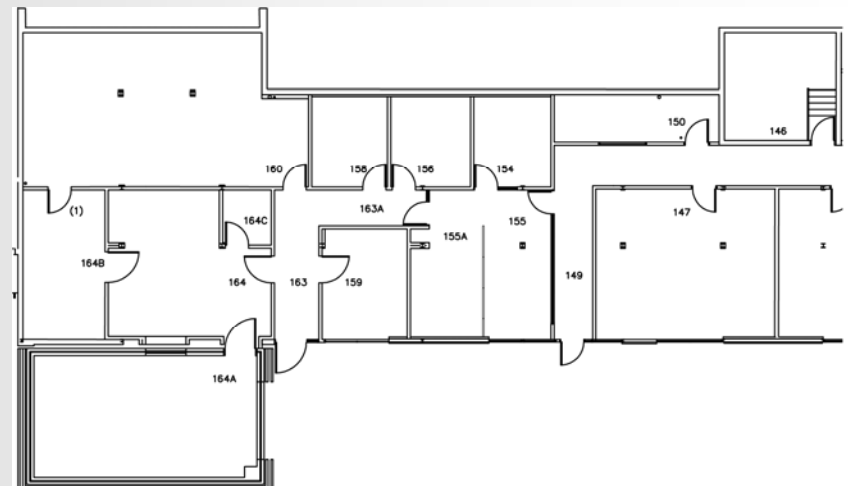


MRI Research Facility



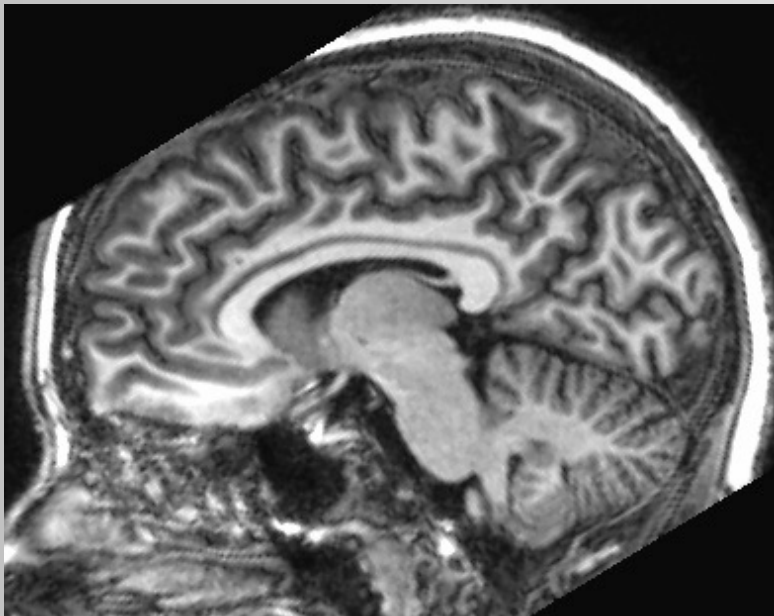
MRI Research Facility

- McDonald Building
- Came online July, 2013
- Siemens 3T Tim Trio MRI scanner
- 2 Exam rooms, conference, classroom
- Support staff (students, faculty)

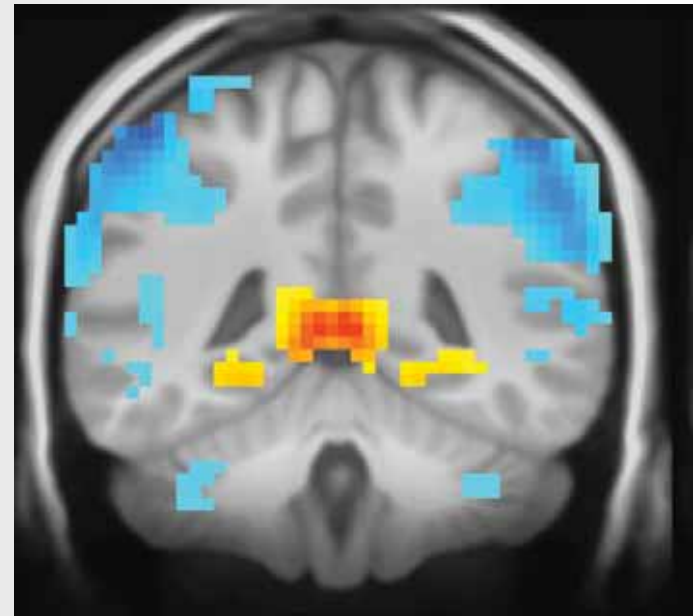


MRI Uses

Structure

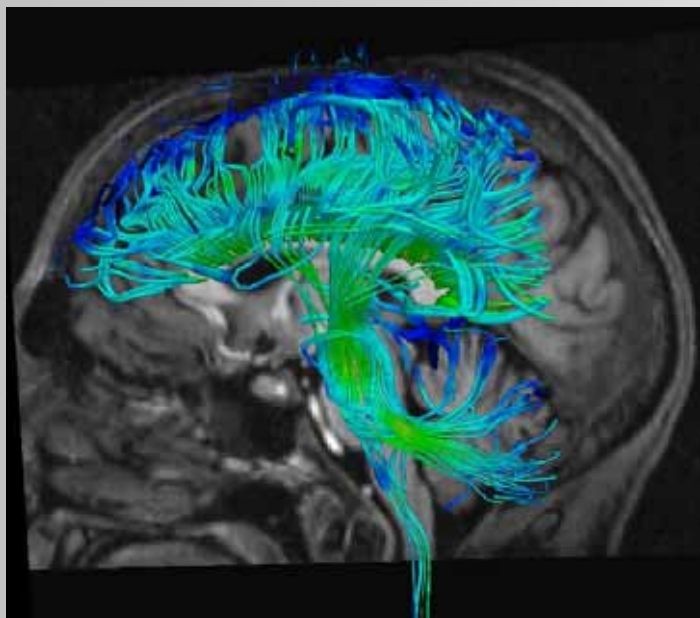


Functional MRI
(fMRI)



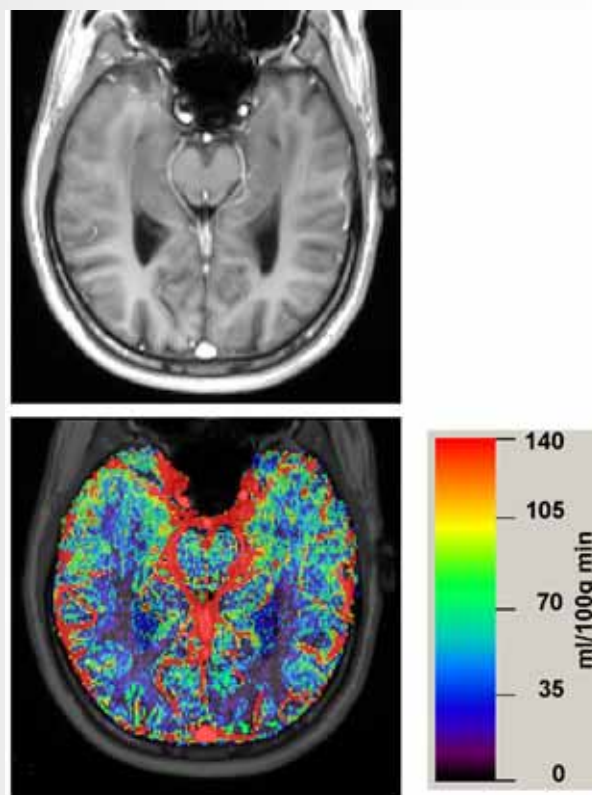
MRI Uses

Diffusion Tensor Imaging (DTI)



<http://people.csail.mit.edu/lauren/dtmri.html>

Arterial Spin Labeling (ASL)



<http://cai2r.net/research/publication/hippocampal-blood-flow-normal-aging-measured-arterial-spin-labeling-3t>

The MAOA Gene Influences the Development of Reflexive Attention



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Areas of Interest:

Genetic contributions to visual attention; reflexive visual attention; environmental influences on visual attention

The MAOA Gene Influences the Development of Reflexive Attention



Rebecca A. Lundwall, PhD
Psychology

SNPs

Recall that DNA consists of sequences of nucleotide bases inherited from parents.

A SNP is what's inherited at a single point. For example:

Parent 1: AACCT**G**TACAC

Parent 2: AACCT**A**TACAC

= Genotype at this SNP is **GA**
(GG and AA also possible)

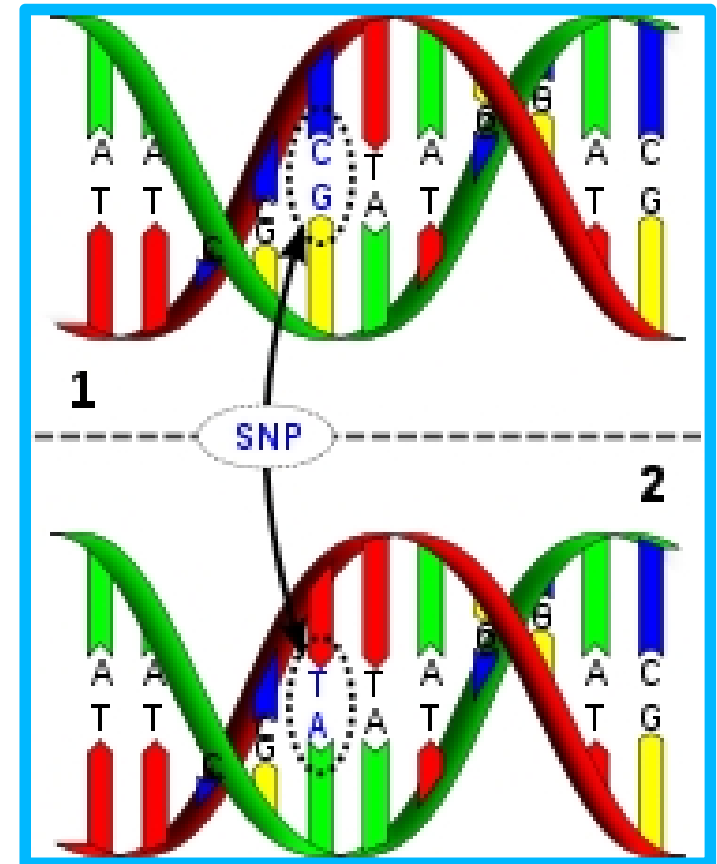
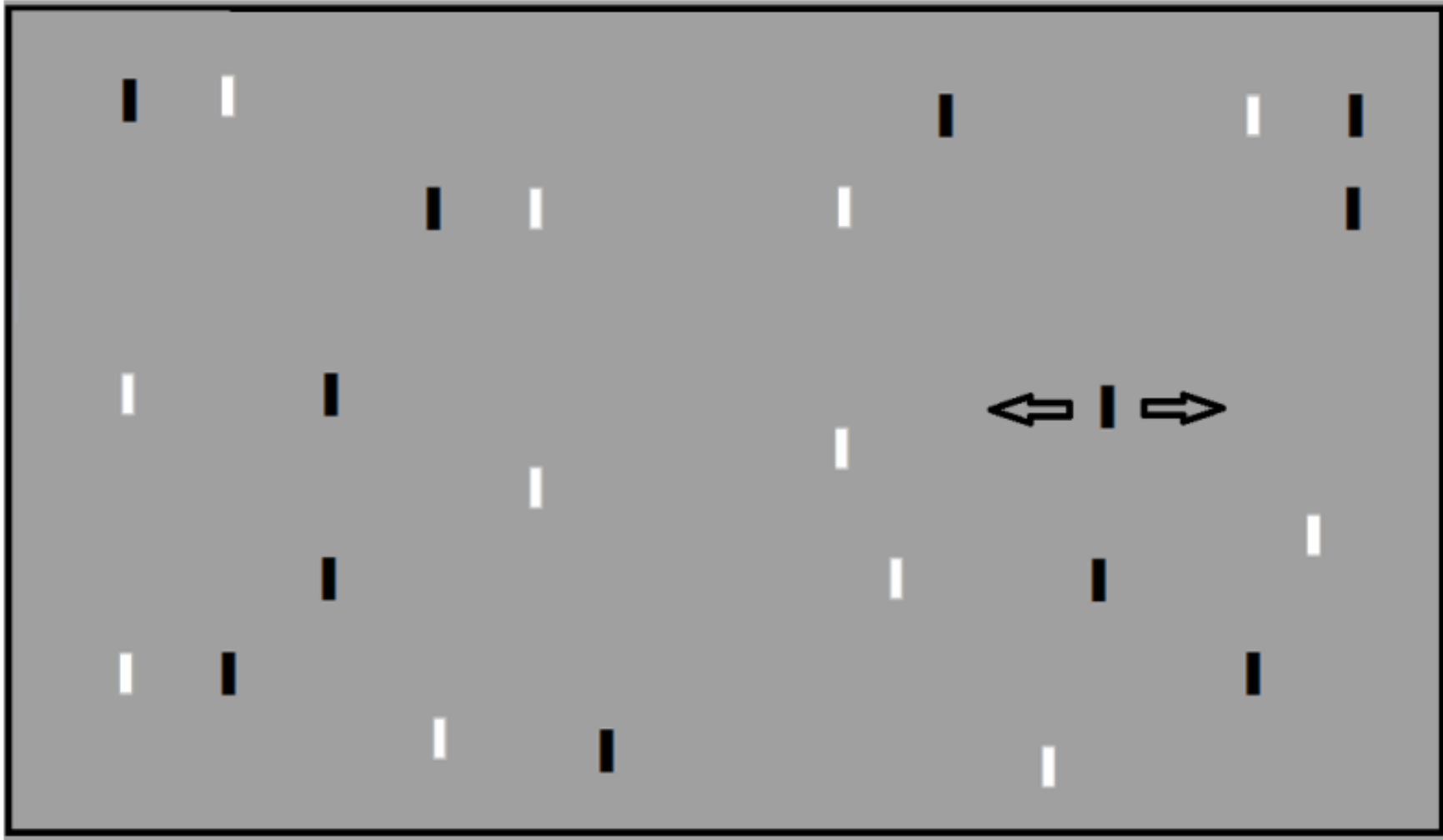
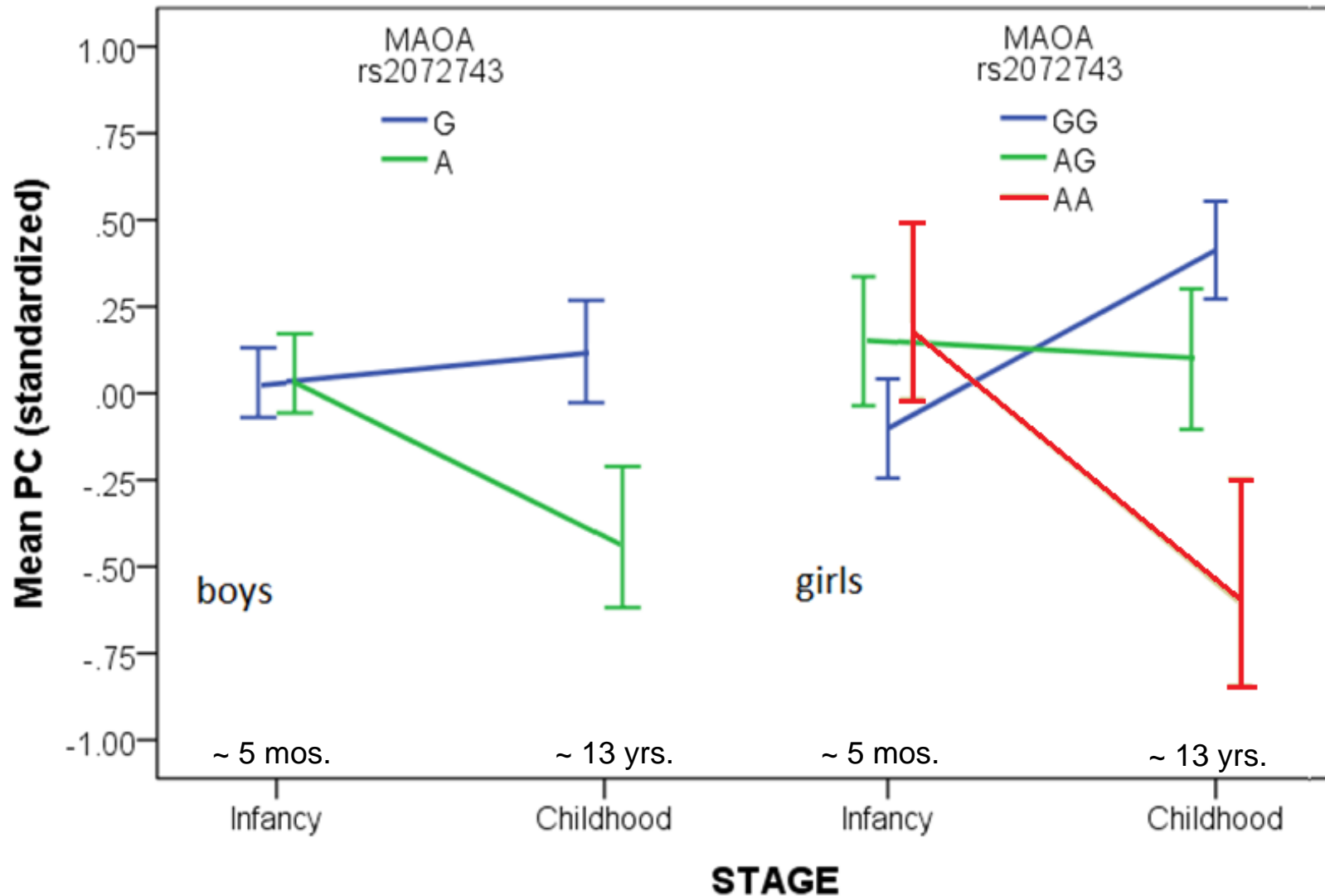


Illustration of Infant and Child Reflexive Attention Task



MAOA SNP Predicts Trajectory



New longitudinal study

- ▶ Track trajectories more precisely
- ▶ Include more environmental factors (e.g., *exercise, nutrition, and social interaction*)
- ▶ Eventually, look at individual differences using fMRI



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Collaborators

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