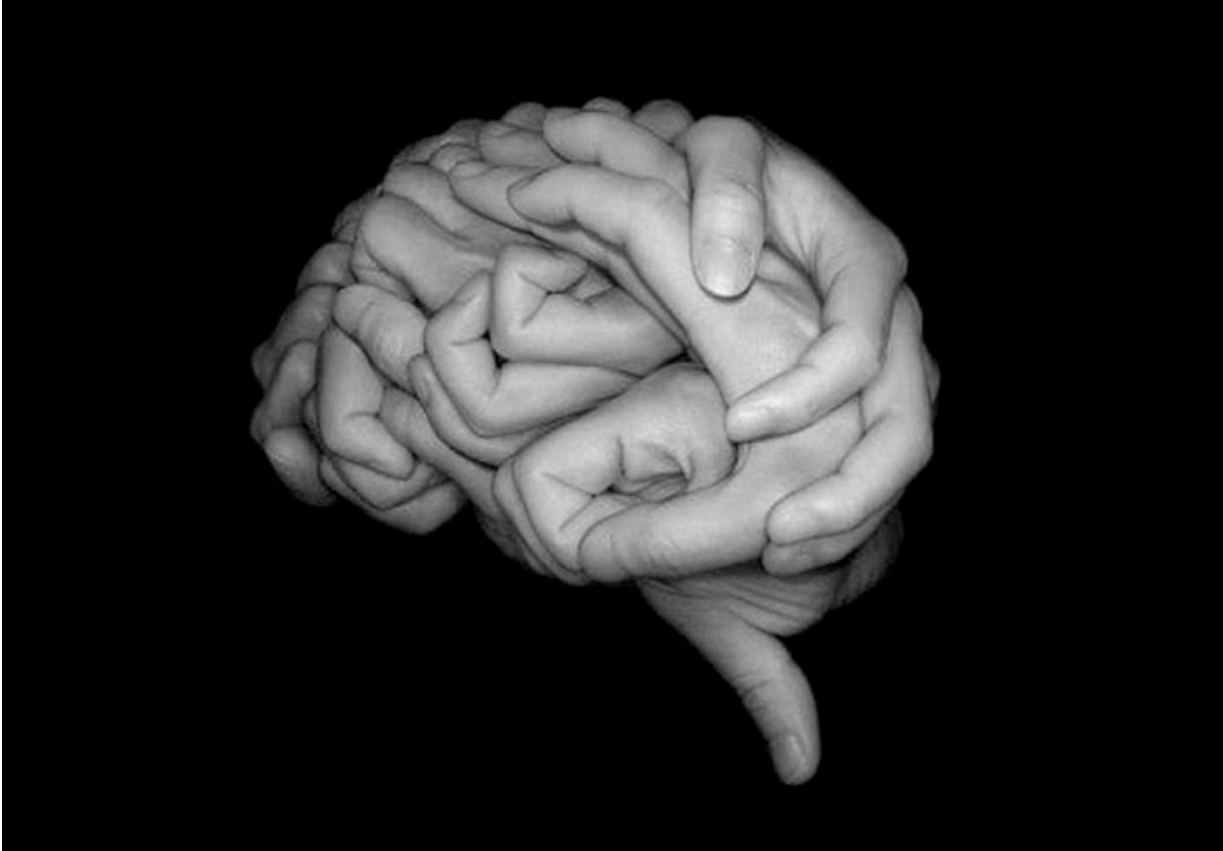


Playing games with your eyes: video games for attention training in individuals with ASD



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Attention is Atypical in ASD

- 1 in 45 children in the US are diagnosed with autism spectrum disorders (ASD)
- Have difficulty *shifting* and *holding* attention
- Attention is a foundational skill—essential for learning
- Existing treatments do not target attention
- Lifetime cost of autism (without intellectual impairment) is \$1.4 Million



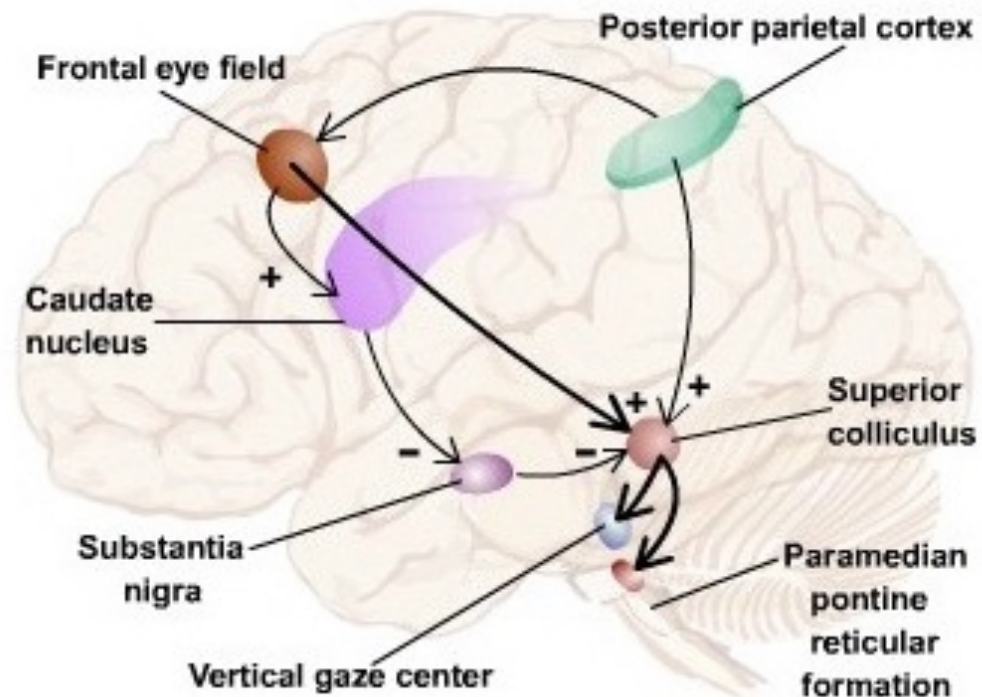
Video Games to Improve Attention Skills

- Suite of gaze-contingent video games designed to improve:
 - Orienting of visual attention
 - Gaze control
- Home-based treatment
 - Easy access
 - Fun to engage
- Using gaze to control a game opens a backdoor to the neural circuitry underlying attention
- Children through young adults with autism can benefit



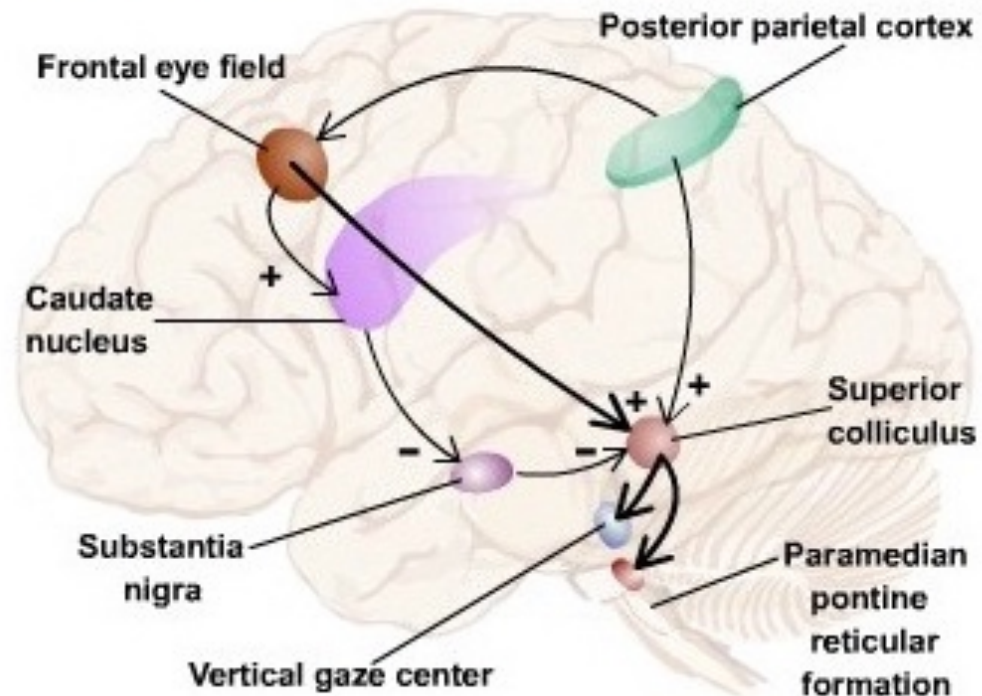
Use Visual Pathways to Train Attention

The Voluntary Saccades Circuit

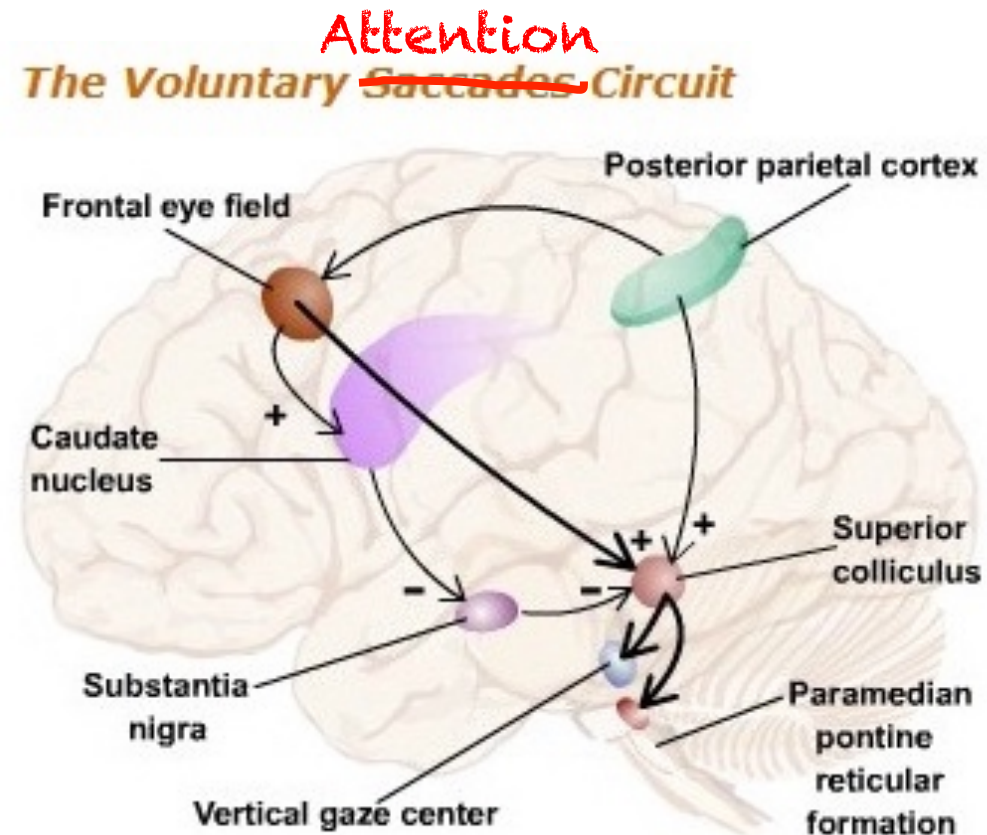


Use Visual Pathways to Train Attention

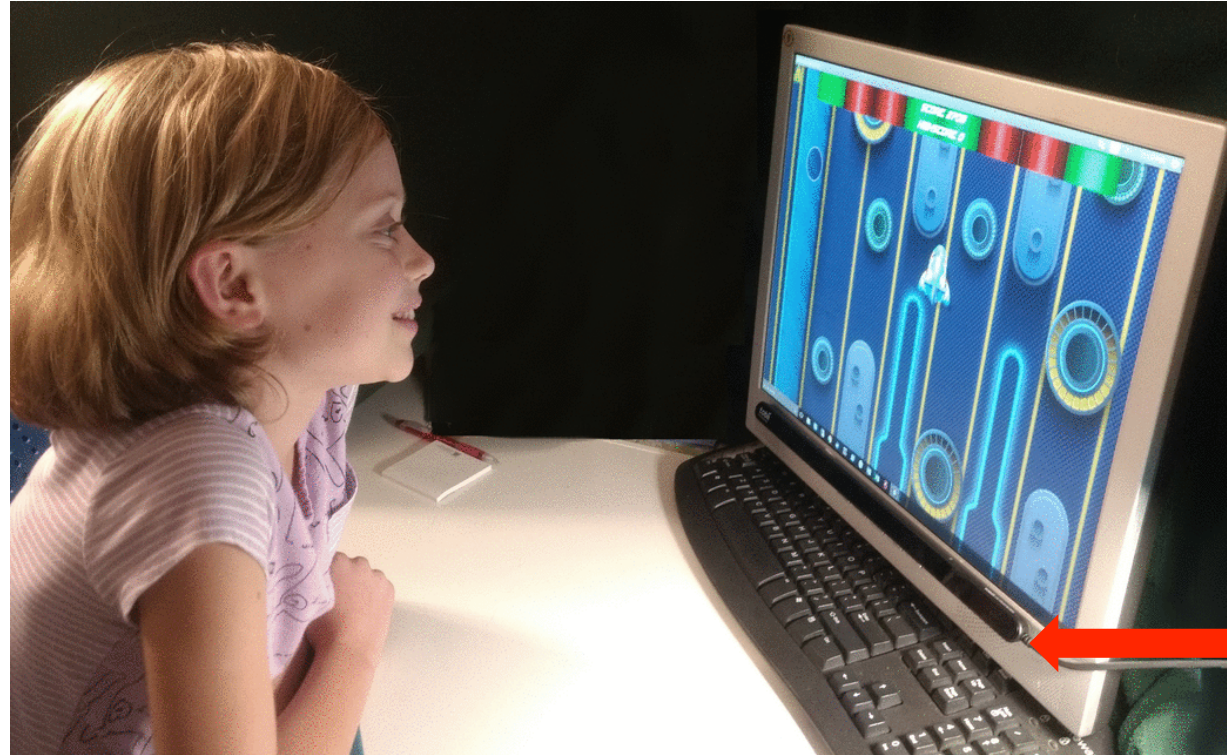
The Voluntary ~~Saccades~~ Circuit



Use Visual Pathways to Train Attention



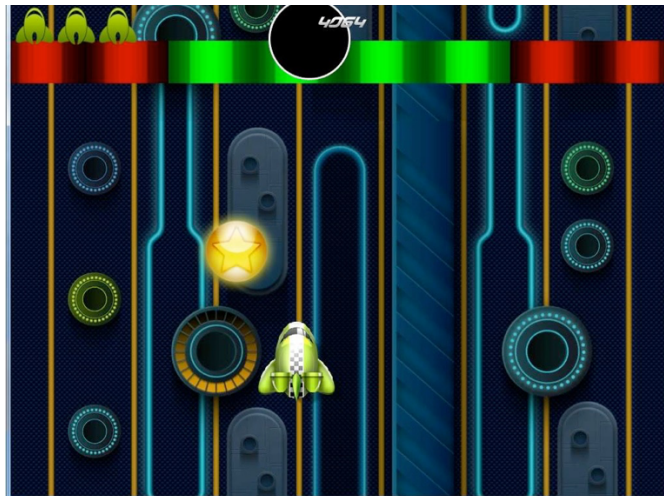
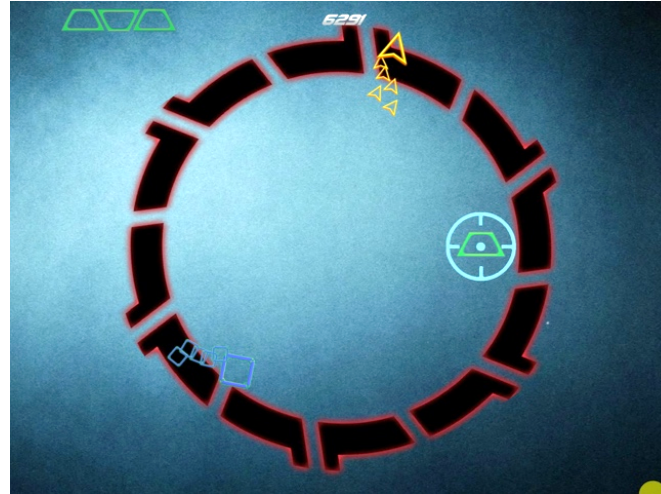
Play Games Using an Eye Tracker



Eye tracker



Suite of Games to Improve Attention Skills

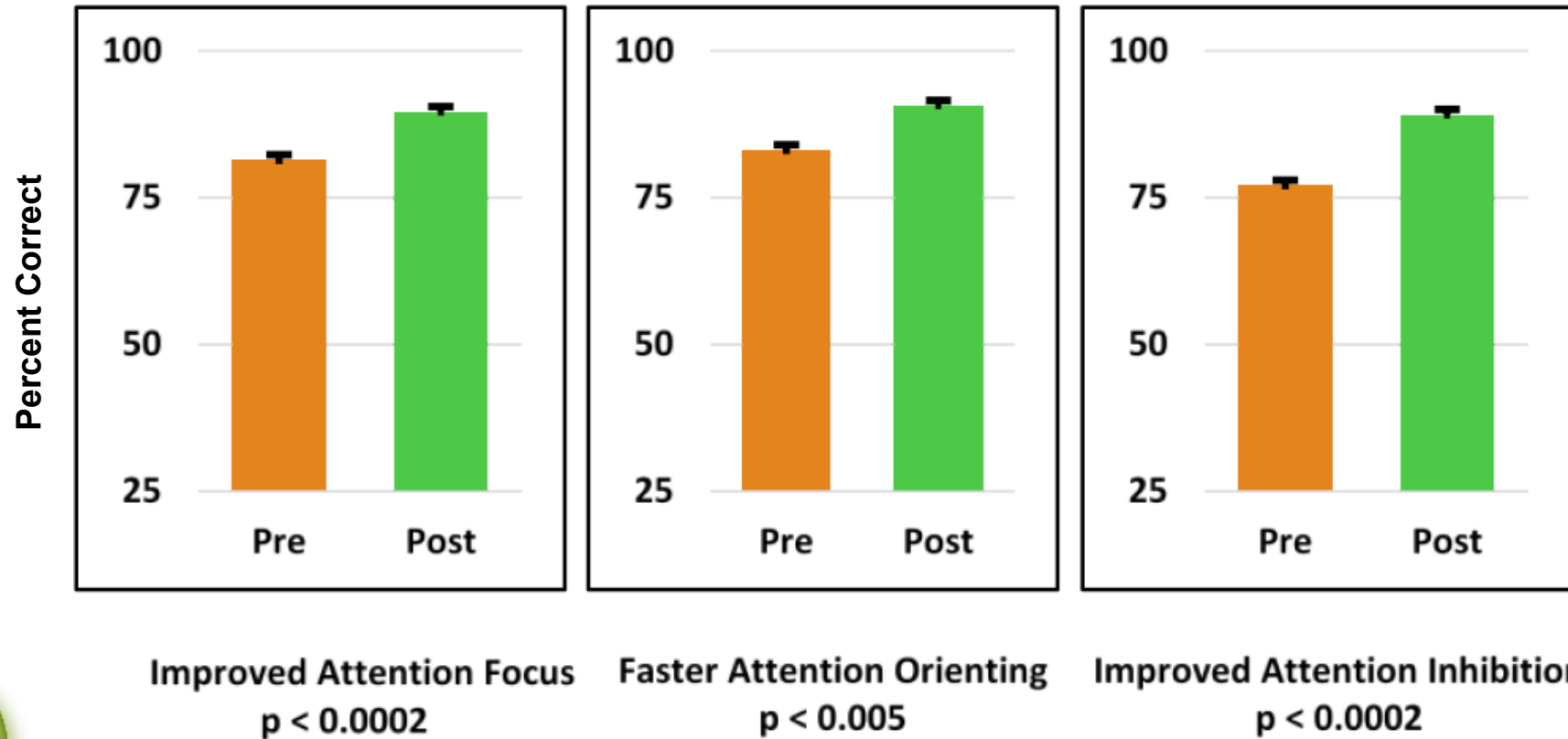


Video Games Designed to Improve Attention Skills

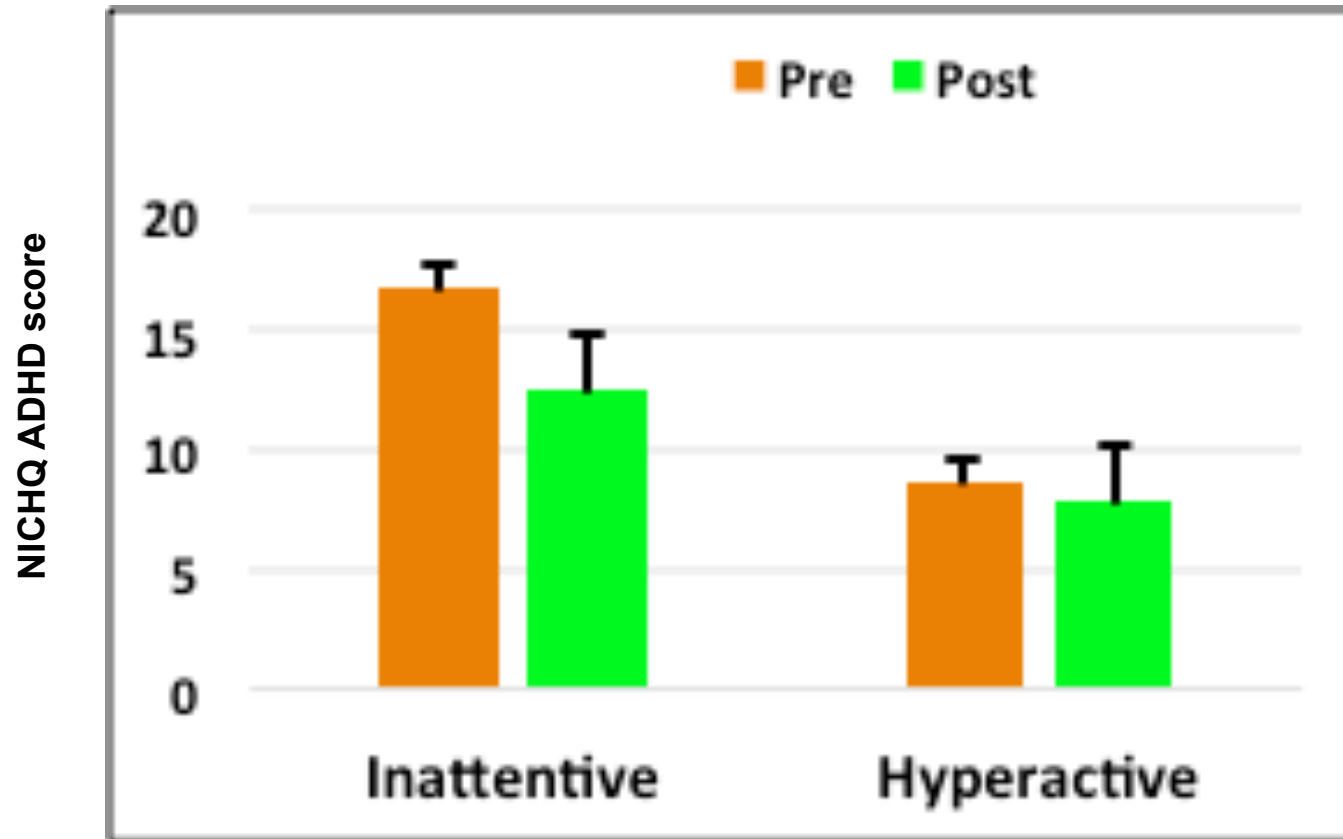
- Improve Attention Orienting Speed
- Broaden Attentional Field
- Improve Attention Disengagement Speed
- Reduce Gaze Fixation Variability
- Reduce Saccade Initiation
- Improve Saccade Accuracy
- Improve Inhibitory (Gaze) Control



Small Clinical Trial: Pre-Post Effects (n=22)



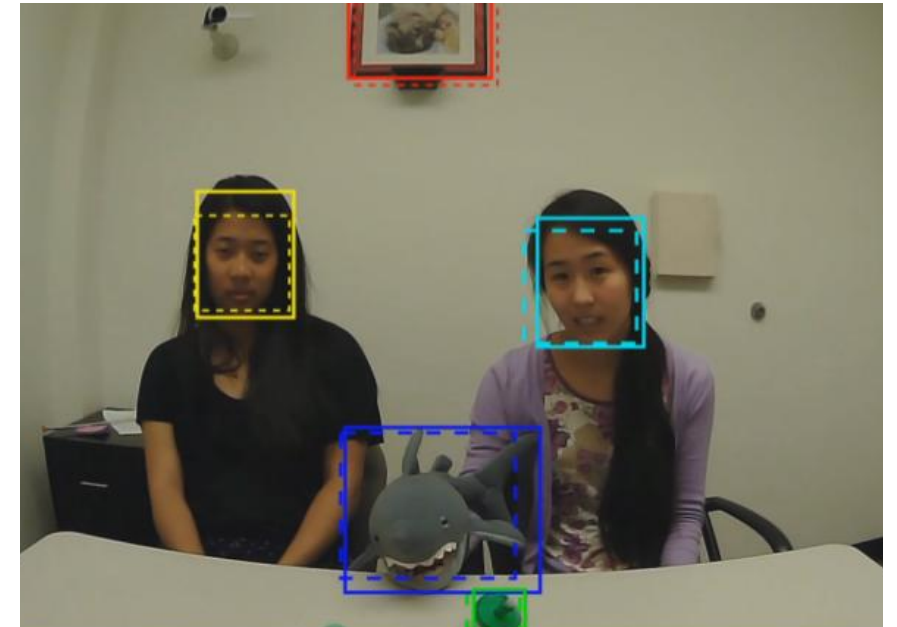
Small Clinical Trial: Pre-Post Effects (n=12)



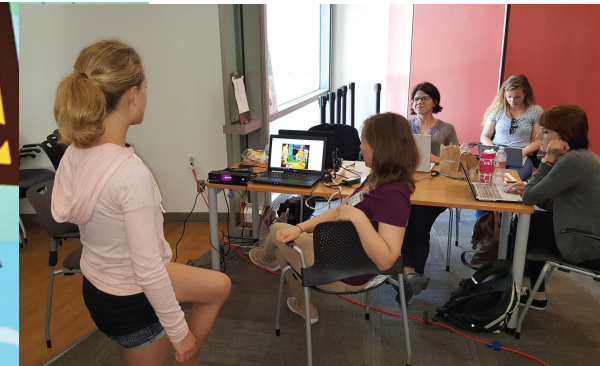
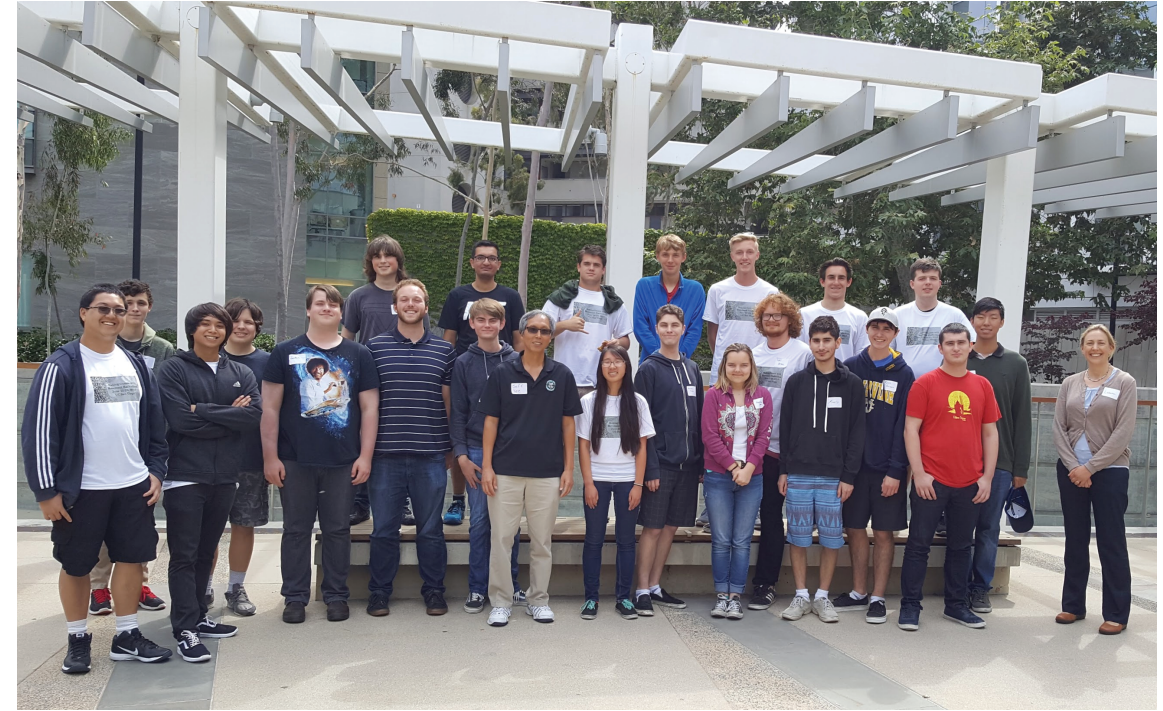
$p < 0.018$



Can we use games to improve gaze interaction?



Building an Ecosystem of Learning around Video Games



Summary

- Home-based, gaze-contingent video games for improving attention
- Game-based training leads to better compliance
- Pilot efficacy of gaze-contingent games shown
- Initially targeting ASD, but also ADHD patients
- See video games as a way to engage a more diverse population of STEM learners on the path to being STEM workers



Thank you!

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