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
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Play Games Using an 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)

- Improved Attention Focus: $p < 0.0002$
- Faster Attention Orienting: $p < 0.005$
- Improved Attention Inhibition: $p < 0.0002$
Small Clinical Trial: Pre-Post Effects (n=12)

NICHQ ADHD score

p < 0.018
Can we use games to improve gaze interaction?
Building an Ecosystem of Learning around Video Games

- Connect with local educators around our needs and opportunities
- Share research need for intervention and assessment games
- Engage young talent pool as interns and first job opportunities
- Showcase talent for broad community engagement

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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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