



Center for
Advancement
of Youth

Social Skills Training for Youth with Autism Spectrum Disorder via Virtual Reality

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OVERALL OBJECTIVES

- To investigate the applicability of virtual reality to simulate real-world social interactions.
- To develop and test an initial virtual reality program that kids with autism could interact with and measure eye movement in a VR headset.
- The time and environment of treatment can be modified and improved.

CENTER FOR ADVANCEMENT OF YOUTH (CAY)

- Fully-integrated, comprehensive pediatric behavioral outpatient clinic
- 65+ colleagues
- 2022: 22,000+ clinic visits
- Referral-based clinic
 - Main referral
 - Used to be ADHD
 - Now, ASD

	2021	FY22 (July 21 – June 22)	2022	FY23 (July 22 – March 13, 2023)	(Jan 2023 – March 13, 2023)
Unique CAY patients with Autism Diagnosis	1,188	1,253	1,229	955	488
Unique CAY Patients Receiving ABA	3	4	7	7	5
Total Unique CAY Patients	8,760	8,717	8,894	6,732	3,429
Completed CAY Appointments with Patients with Autism Diagnosis	2,493	2,890	2,904	1,981	661
Completed CAY ABA appointments	111	426	550	429	151

AUTISM SPECTRUM DISORDER (ASD)

- Prevalence: 1 in 44 in the US
 - Males are 4x more likely to be diagnosed
- Dx Criteria:
 - Persistent deficits in social communication/interaction
 - Reciprocity; non-verbal; relationships
 - Restricted, repetitive patterns of behavior, interests or activities
 - Stereotypy; routines; fixated interests; sensory input
 - Must be present early
 - Clinically significant impairment
 - Not intellectual disability
- Need clear markers

CURRENT STUDY

- Participants:
 - Ages 6-17 years
 - Primary dx of ASD
 - Seen for therapy at CAY
- VR environment
 - 5 scenarios
 - Simple to complex
 - Verbal interactions
 - Measured eye gaze



INITIAL FINDINGS

- Participants:
 - 105 approached
 - 77 did not respond
 - 17 expressed interest, but could not be scheduled
 - 11 enrolled
 - 1 could not complete
 - 10 total, all males
 - 7 mild, 2 moderate, 1 severe
 - Age: M=12.53, SD=2.24

NUMBER OF GAZE FIXATIONS M (SD)

Gaze Area	Mild (n=7)	Moderate (n=2)	Severe (n=1)
Left Eye	3.7 (3.1)	35.5 (46.0)	0
Right Eye	4.0 (2.8)	76.0 (0)	0
Mouth	42.5 (62.8)	230.5 (320.3)	0
Other face area	52.3 (38.5)	224.5 (311.8)	0

- Moderate ASD had significantly more eye contacts

DURATION OF GAZE FIXATIONS M (SD), SECONDS

Gaze Area	Mild (n=7)	Moderate (n=2)	Severe (n=1)
Left Eye	2.6 (3.2)	2.9 (2.7)	0
Right Eye	1.7 (1.7)	3.3 (4.1)	0
Mouth	5.6 (9.0)	7.1 (12.3)	0
Other face area	3.2 (5.9)	5.2 (10.4)	0

- No significant difference in time spent on contacts

DISCUSSION

- Small n
- Mild ASD tended to look at fewer facial features, but for the same amount of time
 - Novel VR experience?
- Moderate ASD tended to shift more
 - Rapid changes look like poor eye contact?

YEAR 1 ACCOMPLISHMENTS

- Captured and measured eye movement
- Increased the complexity of the virtual reality environment
- Incorporated an emotional processing component where the avatars could show emotional responses on their faces

FUTURE GOALS

- Expand the application state-wide
- Gain marketing support
- Engage with other rural entities