



Assessing effectiveness of Minecraft-based interventions to improve interpersonal skill of youth with Autism Spectrum Disorder



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ABSTRACT

Teenagers with Autism Spectrum Disorder (ASD) experience bullying and social exclusion more than typically developing teens which can lead to feelings of depression and anxiety. These consequences are related to significant impairments in social reciprocity, a core feature of ASD. Face-to-face social skills training (SST) like the Program for the Education and Enrichment of Relational Skills for Adolescents (PEERS) has been found to increase social skills for youth with ASD. Can these SSTs be brought online? Minecraft, a versatile online platform and a shared language among teenagers across the globe has been used therapeutically to increase social skills (i.e. social reciprocity, social problem solving, and social collaboration) while minimizing the negative sense of self heightened in face to face experiences. Using the pre-post tests for social skills and scales of depression, anxiety, and loneliness, this study aims to examine the effectiveness of adapting this program in the Minecraft-based environment with 30 teenagers with high functioning ASD (ages 13-18).

INTRODUCTION

- ❑ The ability to establish close, intimate friendships during early adolescence has a positive correlation with social emotional health. Youth with ASD struggle with depression and loneliness far more than neurotypical youth (Buhrmester, 1990). High functioning autistic children struggle to understand the relation between loneliness and friendship. This social knowledge deficit indicates that these children may benefit from specific treatment programs aimed at teaching social knowledge (Bauminger & Kasari, 2000).
- ❑ Social skills interventions that focus on friendship development are needed in adolescents with autism (Locke et al. 2010). Literature review indicates that group-based social skills interventions (GSSIs) appear modestly effective for youth with ASD (Gates et al., 2017).
- ❑ The Program for the Education and Enrichment of Relational Skills (PEERS) was shown to significantly improve the knowledge of social skills and increased frequency of initiating social connection with same age peers as well as improved overall social skills as reported by parents (Laugeson, 2009).
- ❑ Minecraft-based social skill training allows natural interaction among children with ASD meaningfully and build self-confidence and sense of mastery. Children playing Minecraft can communicate directly with others and learn to manage conflicts (Dundon and Scott, 2019).
- ❑ Gerhardt and Smith (2020) documented the use of Minecraft to process trauma experience of an 11-year-old boy with ASD and reported a reduction of his depression symptoms.
- ❑ Zolyomi and Schmalz (2017) suggested that clinicians facilitate cooperation, modeling, joint attention, and performance for neuro-diverse children, including ASD and ADHD, in a safe, compelling environment in online environment like Minecraft.
- ❑ This research project aims to examine the effectiveness of utilizing Minecraft-based intervention to improve interpersonal skills for adolescents with Autism.

PRIMARY AIM AND HYPOTHESES

Research questions

- ❑ RQ1: Is a Minecraft-based social training program effective in improving level of socialization with peers, and overall social functioning of teenagers with ASD?
- ❑ RQ2: Is this intervention effective in improving mental health of teenagers with ASD?

Hypotheses

- ❑ RH1: Adapting PEERS components to Minecraft-based intervention is effective in increasing social skills, level of socialization with peers, and overall social functioning of teenagers with ASD.
- ❑ RH2: Participating in Minecraft-based PEERS will reduce anxiety, depression, and loneliness symptoms of teenagers with ASD.

METHODS

Participants

- ❑ Researchers will reach out to several local community mental health agencies, Seattle Children's Autism Center, and University of Washington Autism Center, to recruit high functioning ASD youths aged 13-18 and their parents or caregivers.
- ❑ Selection criteria: Participant will be administered IQ test to determine high functioning (Kaufman Brief Intelligence Test - Second Edition (IQ of >80), screened for anxiety and depression symptoms, and provide a pre-diagnosis of Autism Spectrum Disorder.

Procedures

- ❑ Participants will be randomly assigned to Minecraft-adapted PEERS program (15 participants) or the control group with a therapist present to keep interactions safe on Minecraft by setting rules and boundaries like a supervised play session (15 participants).
- ❑ All participants will receive 15 weekly Minecraft sessions. The PEERS group will participate in a Minecraft adapted PEERS program while the control group will participate in Minecraft but only be monitored for safe social interactions.
- ❑ Participants and their caregivers will be administered written self-reports and questionnaires, assessing for loneliness, depression, anxiety and social responsiveness (for instruments see Measures Section). Data will be collected via email before the first session and after the last session.

MEASURES

Cognitive

- ❑ Kaufman Brief Intelligence Test - Second Edition (KBIT-2; Kaufman & Kaufman, 2004) assesses crystallized (Verbal) and fluid (Nonverbal) cognitive skills. It is an easel-based test administered by a clinician in a one-on-one setting for ages 4-90 years old. The K-BIT-2 will be used to screen for cognitive functioning with a cut off of composite score of 80 and above.

Anxiety

- ❑ The Screen for Child Anxiety Related Disorders (SCARED; Birmaher et al., 1997), a 41-item inventory rated on a 3-point Likert-type scale, is used to screen for signs of anxiety disorder in children aged 8-18. A total raw score of 25 and above indicates the presence of anxiety disorder. The SCARED will be administered to adolescents. Pre-test data will be as baseline for comparison with post-test data after treatment.

Social Responsiveness

- ❑ Social Responsiveness Scale, Second Edition (SRS-2; Constantino and Gruber, 2012), a 65-item questionnaire a 4-point Likert scale reported by parents, will be used to assess a social ability of children aged 2-18. Higher total score and subscale scores indicate a more severe social impairment level. Parents will complete the SRS-2 at pre- and post-test.

- ❑ Test of Adolescent Social Skills Knowledge (TASSR; Laugeson et al., 2009), a 26-item measure created by the developers of the PEERS program, will be used to test children's knowledge of specific social skills taught during their participation in the program. This test will be completed at pre- and post-test by teenagers. Scores range from 0 to 27, with higher scores indicate greater knowledge of adolescent social skills.

Depression

- ❑ Beck Depression Inventory - Second Edition, (BDI -II, Aaron et. Al., 1996) consists of 21 statements which the participants respond on a 4-point Likert scale. BDI-II is a widely used self-report that was designed to assess the intensity of depression in clinical and normal patients 13-80 years old. Participants will be given the BDI-II as a pre-test to gather baseline data to compare to when participants again will be administered the BDI as a post-test.

Loneliness

- ❑ UCLA Loneliness Scale - Version 3 (Russell et al, 1996) is a 20-item scale designed to measure a person's subjective feelings of loneliness as well as feelings of social isolation. The scale is valid for people 13-18 years old. Participants rate each item on a scale from 1 (Never) to 4 (Often). In this study, the UCLA Loneliness Scale- III is given as a pre-test to gather baseline data to compare to when participants are again administered the LRS as a post-test.

RESULTS

- ❑ Immediate outcome measures (SCARES, SRS-2, TASSR, BDI-II, and Loneliness Scale) will be converted to difference scores being calculated by post-test minus pre-test results. Positive difference scores of TASSR and SRS-2 indicates increased knowledge of social skill and improvement in overall social functioning after treatment. Positive difference scores of the other measures on emotional well-being show a reduction of anxiety, depression, and loneliness.
- ❑ Multivariate analysis of variance (MANOVA) will be used to evaluate statistical significance of the treatment outcomes (p-value < 0.05). The effect of the treatment at the end of the 15th week will be evaluated with two-tailed paired samples t tests (Pre-test T1 - Post-test T2) for the treatment group. The computed t-value is expected to be greater than the statistical t-table value at an alpha level of 0.05, and the computed p-value is less than the alpha level: p < 0.05, to reject the null hypothesis that the treatment is not effective.

DISCUSSION

Social Implications for Minecraft Therapy

- ❑ Minecraft is a socially relevant game for both neurotypical and neurodiverse populations. It is a social connector increasing social inclusion for ASD youth.
- ❑ Therapeutic Minecraft has the potential to benefit ASD youth with increased positive social connections in their immediate face-to-face environments when remote therapy is the only option.
- ❑ Therapeutic Minecraft may offer ASD youth access to social skills training when they may have little to no access to any in-person mental health services.
- ❑ Therapeutic Minecraft may allow for ASD youths to increase their social circle along with their social skills among peers in a safe controlled way.

Implication for clinicians Working Remotely

- ❑ The sudden onset of the 2020 global pandemic (COVID-19) that immediately shuttered in-person therapy offices, sent clinicians and their clients into virtual therapy rooms. Clinicians were scrambling to figure out how best to deliver services virtually. If this pilot study is able to demonstrate increased social learning and social skills, what has been implied through rich description as successful social skills interventions for ASD youth via Minecraft (Zolyomi & Schmalz, 2017), clinicians may have a powerful tool at their fingertips.

Implications for Future Research

- ❑ Therapeutic Minecraft has newly arrived on therapy scene and this will be the first randomized research of its kind. What has been shown is that ASD youth do gain significant benefits from social skills groups (Laugeson et al., 2009). We chose one evidence based social skills training to explore the possible benefits of learning social skills via Minecraft. Further research investigating a variety of evidence based social skills curriculums focusing on different aspects of social learning using Minecraft as the therapeutic platform would be illuminating. Additionally, research exploring how long are gains in social skills maintained after the intervention? And what are the effects on the family unit?