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# **BACKGROUND REVIEW**

I am working with Dr. Janine Stichter, a professor in the Department of Special Education and a researcher at the Thompson Center for Autism and Neurodevelopmental Disorders at the University of Missouri. I am also working with Dr. John Bruno. He currently consults nationally, is an adjunct faculty member with two institutions, and is an administrator for the Special School District of St. Louis as an Autism Specialist. John Bruno has worked closely with Janine Stichter for many years.



# Thompson Center for Autism & Neurodevelopment Disorders

Dr. Stichter and her colleagues spent 7 years developing the 32 interventions in this university research and evidence-based program to help children with Autism Spectrum Disorder (ASD). Dr. Bruno has spent years implementing the research program in St Louis schools. There are thirty of us on our team and 11 have PhDs. They have proven efficacy in 8 independent university studies conducted in over 60 schools. Research data shows this program will significantly help a large number of children with ASD develop their social skills. Our aim is to help them get a job, keep a job and enjoy independent lives. The interventions have been converted to a Virtual Learning Environment (VLE). This VLE was both effective and very popular with students, instructors and parents. . My small business has the exclusive rights to commercialize the program and we plan to apply for SBIR Phase I and then Phase II grants.

Our plan for SBIR grants involves applying for a Phase II grant if we are awarded a Phase I.

### PHASE II DESCRIPTION

This intervention curriculum and the Virtual Learning Environment (VLE) have been successfully tested in 60 schools over the past 7 years. For example, results show that 65% of the children showed improvement in all 5 of the Social Responsiveness Scale (SRS) subscales. The program is delivered in a VLE where students work in a video game like environment. We have videos of the sessions and testimonials from parents, students and instructors. Unfortunately the platform the VLE was created in is no longer supported. As part of Phase II we will convert the current virtual learning platform to the Unity platform which is what is used in the leading video games. Students will immediately recognize all of the controls in this new VLE.

# PHASE I DESCRIPTION

Before we create the new VLE for Phase II, we want to verify the market. Schools and professionals who have used the program in our research are urging us to expand our understanding of the SCI effect on a larger group. They are asking us to expand beyond the narrow construct of "Autism" and include those identified by the broader construct of "social skills deficits".

You also recommended that we focus on an asynchronous approach that is not schedule or time dependent and can be used across a wide range of abilities. Our team has developed a research program based on your input. We will focus on one of our 32 modules in the SCI program, Emotion Recognition in faces, and update this first module to the Unity platform with functionalities that will allow it to be delivered asynchronously.

# DESCRIPTION OF THE NEW ASYNCHRONOUS CBI INTERVENTION MODEL

The participant will have solo access to the Unity gaming based virtual learning environment with avatars. An adult has the option of sharing in the asynchronous experience and also be an avatar. With the focus on emotion recognition in facial features, the participant is asked in the virtual world to make a series of faces that accurately

depict various emotions. Their computer takes their picture and a caricature of that face appears in the virtual world. The program evaluates the face and shows what features do and do not match the emotion. This active feedback provides a score and the next emotion is requested and that face receives a score. The participant can try repeatedly to receive a better score and also have the option of posting their score on a leaderboard where they can compete with others. This constant feedback loop provides the Cognitive Behavioral Intervention construct.

# FOCUSING ON AUTISM AND FILLING EXISTING GAPS

Dr. Stichter has extensively published her work on why this program is appropriate for ASD and we have the results of eight independent university studies. We have over 2,900 research documents and videos in our Dropbox on this topic.

This university research and evidence-based program fills many gaps in helping people with autism that have access to school districts large enough to create social skills groups with similar students. We are passionate about helping children and parents in small school districts who find it difficult to enroll sufficient numbers of individuals at a similar age, live close enough to participate in an in-person group and with students who are at the same level of social competence. Because our VLE is cloud based we can include a child at home or in an underserved area with classmates and instructor in a well-served urban area. We can also help mobile families, such as those in the military. A child can retain the same classmates and instructor despite frequent relocation.



# ISOCIAL/SCI ABSTRACT WITH CITATIONS Updated December 10, 2018

Since 1986 the rates of Autism have been increasing exponentially from a rate of 1:188 to an alarming rate of 1:59 as of 2018 (Baio, et al, 2018).

Social Skills and Executive Functioning skills are key struggles for individuals on the Autism Spectrum (DSM IV, 2013). Basic and effective social skills are critical for successful post-school outcomes for all youth. They are necessary to obtain and keep employment, understand and negotiate school and vocational expectations, acquire and maintain healthy interpersonal relations, and generally to be a good citizen (Gresham, Sugai, & Horner, 2001; Howlin, Goode, Hutton, & Rutter, 2004; Wehmeier, Schacht, & Barkley, 2010).

Social competence is a primary deficit across many populations most specifically, those identified with autism, emotional impairments, or students identified as not ready to learn (American Psychiatric Association [APA], 2013; Gresham, et al., 2001). Individuals with social skills deficits benefit from being in social skills interventions with others who have a similar social skills struggles (Stichter, Herzog, Kilgus, & Schoemann, 2017). Small school districts and highly mobile families, such as those in the military, can find it difficult to find large enough numbers of individuals at a similar age, living close enough to participate in an in-person group, with students who are at the same level of social competence (Strange, et al. 2012; Stichter, et al. 2017).

Stichter's Social Competence Intervention for Adolescents (SCI-A) has been shown to be effective in improving social skills with adolescents with Autism. However, scholars have suggested that interventions should offer more focus on the core deficits unique to the specific population of students (Dawson, 2008; Lechago & Carr, 2008; Lord et al., 2005; National Autism Center [NAC], 2009; Rao, Beidel, & Murray, 2008; Stichter, Randolph, Gage, & Schmidt, 2007; White, Keonig, & Scahill, 2007)." From Christ, S. E., Stichter, J.P., O'Connor, K.V., Bodner, K., Moffitt, A.J., & Herzog, M.J., 2017. Stichter, et al, have demonstrated that

the same SCI in-person approach has also shown the potential to also be effective in a Virtual Learning Environment (VLE). (Wang, X., Laffey, J. Xing, W., Ma, Y., Galyen, K., Stichter., J.P. (2017); Laffey, J., Stichter, J.P., & Galyen, K. (2014); Stichter, J. P., Laffey, J., Galyen, K. & Herzog, M.J. (2014); Schmidt, M., Laffey, J., Schmidt, C., Wang, X., & Stichter, J.P. (2012); Schmidt, M., Laffey, J., Schmidt, C., Xianhui Wang, & Stichter, J.P. (2012); Laffey, J., Schmidt, M., Galyen, K., & Stichter, J.P. (2012).

Specifically studying the SCI intervention on a broader group of individuals using the conceptual framework of individuals with social skills deficits will help us expand the number of individuals that can benefit from this intervention. Given that not all students who struggle with social skills have Autism and not all students on the spectrum have been formally evaluated and identified, this will be a much broader application of the technology. This will also help us identify appropriate participants for the Virtual Learning Environment version of the SCI. Given that the current format of the VLE version of the SCI is no longer supported, we will seek funding during Phase II to develop. With research in mind, the plan is to create the new version with the ability to offer multiple versions of the game to allow for the option to include or remove specific elements of the social skills intervention. This will allow us to randomly assign participants to treatment and control groups in a double-blind construct.



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# SPECIFIC AIMS OF THE SBIR I PROJECT

The specific aim of this application is to expand the understanding of the lesson's effect on a larger group identified by "social skills deficits" rather than narrower construct of Autism. Based on those results we will convert the IT platform of the behavioral intervention software to an updated, web-based gaming platform; scale the product availability through school and individual membership arrangements and make interactive social intervention curriculum available to parents, special education and regular education classrooms. We will create online training so educators, parents and professionals can successfully utilize the product intervention to improve social skills of children and youth with ASD and other disorders.

### **HYPOTHESES**

Phase I - Our hypothesis is that the preliminary effects found implementing the SCI-A on a small group of individuals with autism will also improve social competence of individuals identified as having social skills difficulties.

Phase II - Our hypothesis is that an updated VLE version of the SCI, also known as iSocial, will not only replicate results found with individuals with Autism but also with a larger group identified as individuals with social skills difficulties.

#### RESEARCH DESIGN

SBIR Phase I- Given the limited funds at this phase, we will use an AB design with Cohort Randomize Trials (CRT) to Business As Usual and Intervention as a proof of concept. SBIR Phase II - The VLE in Phase II will allow us to create double-blind interventions with randomization of treatment. Our university PhD researchers will randomly assign VLE seats that provide subjects with either the social skills intervention embedded into the program or be assigned to a control group that receives the VLE experience but without the added social skills intervention.

### **FINAL PRODUCT**

We will have modern video gaming platform experience that will be used to develop essential social skills. The intervention is cloud based and has a SaaS business model. The program will be available on an asynchronous basis but can also be incorporated in a school room setting. The home version for parents, children and practitioners is administered asynchronously as individual time and schedules allow.