

Social awareness increases prove brain changing in adults with autism

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Adults with autism demonstrate enhanced social skills and brain change after participating in an intervention developed at the Center for BrainHealth. Credit: Center for BrainHealth

Researchers at the Center for BrainHealth at The University of Texas at Dallas, in collaboration with co-leading authors at George Washington University and Yale, have demonstrated in a pilot study that a clinician-driven virtual learning platform, tailored to young adults on the autism spectrum, shows improved social competency. Findings published in *Autism Research* reveal that increases in socio-emotional and socio-cognitive abilities correlate with brain change. Results included increased activation in the brain's socio-cognition hub with gains linked to improvement on an empathy measure.

The present findings are among the first to demonstrate neural changes that are associated with significant behavioral gains in [young adults](#) with high-functioning [autism](#). Researchers were particularly intrigued by the significant relationships between behavioral and brain changes, as there is a lack of research in this area. Historically, most [autism research](#) has focused on early childhood with treatment results typically measured solely by observable and self-reported behaviors.

"Brain change is a big deal in adults with autism. Many people implicitly believe that brain changes are unlikely for adults with autism, which might affect how they interact with those adults. This study challenges that very notion and has profound implications in the way people would view, interact, and treat adults with autism," said Daniel Yang, PhD, assistant research professor at the George Washington University Autism & Neurodevelopmental Disorders Institute.

"Many individuals with autism spend months and years in different

forms of trainings with limited measurable gains," explained principal investigator Dr. Sandra Bond Chapman, founder and chief director of the Center for BrainHealth. "A major contribution of our study is the results challenge the outdated view that [social cognition](#) issues are difficult to remediate after childhood. Indeed, we find it promising that this intervention extended the potential to positively impact brain systems and social cognition into adulthood."

The social cognition virtual reality training, now available under the name Charisma through the Center for BrainHealth's Brain Performance Institute, demonstrated that study participants with autism shifted their attention from non-social information—a behavior commonly displayed in autism—to social information, a skill that is meaningful.

This study identified three significant brain-behavior changes.

1) Theory of mind, or the ability to realize the intention of others, is often lacking in individuals with autism. After the intervention, the part of the brain associated with socio-cognitive processing showed an increased activation of social stimuli compared to non-social stimuli.

2) The brain area responsible for socio-emotional processing showed individual gains in emotion recognition with decreased activation to social versus non-social stimuli. Thus, those that showed increased recognition of emotions paid more attention to social stimuli than non-social stimuli.

3) The part of the brain for visual attention showed significantly decreased activation to non-social versus social stimuli across all participants.

This virtual learning platform lays the foundation for scientifically based precision intervention for adult individuals with autism. "Platforms like Charisma allow for infinite flexibility in repeatable social practices in a

motivating computer-based environment that offers a safe place to attempt interaction without the real-world consequences of failure", added Tandra Allen, the lead clinician who conducted the trainings at the Center for BrainHealth.

Young [adults](#) with high-functioning autism received the evidence-based behavioral intervention over five weeks for a total of ten hours. During the training session, the clinician and participants interacted entirely through virtual avatar characters and engaged in real-time, non-scripted, age-appropriate situations such as job interviewing or dating, while receiving real-time feedback from a coach clinician. Participants were given multiple opportunities within a session to practice these social skills and were tested pre- and post-training.

According to Chapman, virtual learning platforms have the potential to transform assessment, enhancement and motivation toward treatment in a wide range of populations needing practice in complex social environments.

"Our study suggests that our Charisma™ social cognition training, developed by the Center for BrainHealth's technology team, may offer an advantage in achieving gains to that conferred by traditional types of training in autism. Support of this potential is that the gains were achieved after just 10 hours of training and were present in both social skills as well as the strengthening and reorganizing of underlying [brain](#) networks that support social functioning," added Chapman.

More information: Y.J. Daniel Yang et al, Neural mechanisms of behavioral change in young adults with high-functioning autism receiving virtual reality social cognition training: A pilot study, *Autism Research* (2018). [DOI: 10.1002/aur.1941](https://doi.org/10.1002/aur.1941)

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