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Social Learning in Individuals with Autism

Social learning is an important tool that people use to observe the people around them and to imitate their behavior. Social learning is how most people learn to exhibit social behaviors such as having a conversation with friends or acting appropriately in a public setting. For individuals with autism that struggle with social learning, learning these behaviors can be much more challenging. Understanding how individuals with autism engage in social learning can equip therapists and caregivers to help individuals with autism develop positive social skills.

Social Learning for Individuals with Autism

Social experiences in early life shape the neural pathways that develop lifelong social skills. For many individuals with autism, developing these important social skills can be a challenge. To explain the reason for this challenge, one theory says the social impairments observed in autism spectrum disorder are the result of mistimed early sensitive periods in brain development, especially in the development of the amygdala. In support of this theory, research has found that the release and synthesis of oxytocin plays a critical role in activating neural circuits that are associated with various social behaviors (DeMayo et al., 2019).

In addition to neural circuits, another important neurological mechanism for developing social skills is activation of the mirror neuron system. For many individuals with autism, completing tasks involving activation of the mirror neuron system is challenging in three ways (Vivanti & Rogers, 2014). First, individuals with autism are less likely to use the mechanisms that allow for the implicit mapping of and learning from others' behavior. Second, individuals with autism are less likely to be motivated to attend to and model other people. Third, individuals with autism often struggle with the flexible and selective use of social learning.

Attachment to caregivers provides another component of social learning. Developing a secure attachment with caregivers sets the foundation for social learning to occur early in life. Caregiver-child attachment and social behaviors share common physiological and behavioral mechanisms. However, individuals with autism often form secure attachment relationships, despite a tendency for reduced socioemotional reciprocity and motivation for social interaction. This suggests that disruptions in social mechanisms can coexist with secure caregiver-child attachment. Furthermore, in the development of neurotypical individuals, early caregiver-child attachment quality is associated with later positive social outcomes. However, this is not always the case for individuals with autism. For children with autism, improvements in caregiver-child attachment do not necessarily result in improvements in social functioning (Vivanti & Nuske, 2017).

Relationships Between Social Learning and Fear Learning

Similar mechanisms are involved in both fear learning and social learning. For example, fear learning and risk perception are influenced by knowledge inferred from present situations through social learning and past information resulting from priming effects. This is consistent between individuals with autism and neurotypical individuals. In both groups, risk perception has been found to depend on recent past events and priming effects. Furthermore, social learning has been found to moderate risk perception. These findings suggest that perception of past events and peer interaction play crucial roles in fear learning and the development of risk perception abilities. So, individuals with autism that struggle with social learning may also struggle with fear learning (Wadhera & Kakkar, 2020).

However, the struggle with fear learning for individuals with autism does not appear to be a weakened fear response. In fact, when individuals with autism are presented with the

opportunity to engage in peer interaction and observational social fear learning, they can develop even stronger learned fear responses, compared to their neurotypical peers. In a 2020 study by Espinosa et al., adults with autism and neurotypical controls completed a social fear learning procedure in which participants watched a demonstrator receiving electrical shocks in conjunction with a previously neutral conditioned stimulus, but never with a safe control stimulus. Skin conductance was used to measure autonomic responses of learned threat responses to the conditioned stimulus signaling the shock versus the safe control stimulus. Visual attention was also measured during learning using eye tracking. To establish a non-social-learning baseline, each participant completed a test of classical conditioning. Individuals with autism demonstrated greater social learning of fear, compared to the neurotypical control group. Furthermore, for the neurotypical participants, but not for the autistic participants, higher attention to the demonstrator's face predicted reduced social fear learning. These findings suggest that individuals with autism lack the ability to capitalize on facial information in social contexts to regulate anxious responses. As a result, they are more likely to have an elevated fear response in social situations which facial clues would suggest are harmless. This suggests that individuals with autism rely on mechanisms other than facial clues to develop learned fear responses and risk perception abilities. However, use of these alternative mechanisms often creates an even stronger learned fear response, compared to their neurotypical peers. So, the challenge for individuals with autism is not a weakened fear response, but in distinguishing between a fear response that is helpful and a fear response that is an overreaction. This could be due to difficulty in capitalizing on relevant facial cues.

Individuals with autism often exhibit abnormal trust and deception behaviors, which provides another example of the difficulty for individuals with autism to distinguish between

helpful and overreactive fear responses. Research by Yang et al. (2017) examined whether abnormal trust and deception behaviors in children with autism were primarily due to their deficits in social learning. The researchers matched children with autism to neurotypical children according to age and socially-skilled abilities. To measure distrust and deception behaviors, the children completed a controlled series of tasks as part of a hide-and-seek game with the goal of winning prizes. Participants were then randomly assigned to either a social cue or nonsocial cue condition and completed the distrust and the deception tasks sequentially. Results indicated that while neurotypical children improved their performance with more social components, children with autism lacked this performance gain, though they performed similarly to neurotypical children in the condition with reduced social components. These findings provide further evidence that while individuals with autism have similar fear learning skills, they rely on different mechanisms to build these skills. Deficits in trust and deception for individuals with autism were associated with failure of using and recognizing social cues. Herein lies the chief difference between social fear learning for individuals with autism and their neurotypical peers: the ability to recognize and capitalize on facial and social cues.

Interventions Targeting Social Learning Skills

A variety of interventions have been proposed to foster the development of social learning skills for individuals with autism. These interventions include oxytocin treatment, the Early Start Denver Model, social cognitive intervention, social learning therapeutic technology, LEGO-based social play therapy, and structured social exercise routines. These interventions focus on increasing social skills, fostering peer interaction, and developing the abilities to recognize facial cues.

The hormone oxytocin plays a critical role in the activation of neural circuits that are associated with various social behaviors. Oxytocin treatment can be applied early in life for individuals with autism to target neural circuits for social development. With oxytocin treatment, clinical practice can move emphasis away from delivering broad treatments based only on diagnostic classifications to targeting relevant neural circuits at critical times of development to optimize social learning (DeMayo et al., 2019). One example of a cognitive treatment approach for fostering social development in individuals with autism is the Early Start Denver Model. This model focuses on activation of the mirror neuron system, through practicing social imitation, peer engagement, verbal and non-verbal communication, and affect sharing (Rogers & Dawson, 2020).

Cheung et al. (2021) evaluated the efficacy of a school-based social cognitive intervention for children with autism. Children and adolescents with autism were taught from a visually scaffolded social skills program based on theory-of-mind principles. Using a mixed-methods approach, children's social competence was assessed at pre-test and post-test. Compared to a waitlist control group, children in the intervention group demonstrated significant gains on theory-of-mind and social skill measures. Focus groups and interviews were conducted with parents and children to explore parents' views and generalization of children's social skills across different settings. Analyses of these data revealed that children's social participation improved in home, community, and school settings. These findings support the implementation of a school-based social skills intervention for children with autism as a cost-effective way to build important social skills. However, further research is needed before generalizing these results to adults with autism.

Daniels et al. (2018) examined the feasibility of a prototype social learning therapeutic tool for children with autism using Google Glass. The researchers examined if children with autism would wear such a device, if providing the emotion classification improved emotion recognition, and how emotion recognition differs between autistic participants and neurotypical controls. In the study, children identified the emotions from static facial images on a computer screen in three successive conditions: the first with no information about the emotion provided to the child, the second with the correct classification from the Glass labeling the emotion, and the third again without emotion information. Analyses suggested that the ability to recognize surprise, fear, and neutrality is different between children with autism and their neurotypical peers. All 43 children were comfortable wearing the Glass and children with autism did not feel overstimulated when wearing the device. Both participants with autism and neurotypical participants who completed the emotion recognition task wearing the Glass showed increased accuracies in emotion labeling.

Wright et al. (2023) investigated LEGO-based therapy as an intervention to increase the social skills of children with autism in schools. In the LEGO therapy group, participants worked together to build LEGO models as a therapeutic social learning exercise. In the control group, participants received only the usual social support from teachers or other professionals in their typical school setting. The teachers, parents, and children all completed questionnaires before and after implementation of the LEGO therapy to measure the children's social skills. The children in the LEGO-based therapy groups had greater gains in social skills compared to the control group. In addition, the LEGO based therapy was not very costly for schools to run, and parents and teachers both thought it was good for their children.

Habib et al. (2018) explored the changes in physiological, cognitive, and social development for children with autism after completing structured exercise routines. The structured exercise routines offered unique opportunities for social learning in a non-academic context by allowing students to practice important social skills such as observation, imitation, and self-regulation. However, these social skill benefits are often overshadowed by the physiological benefits of structured exercise. A balanced perspective should consider both the social and physical benefits of structured exercise routines for children with autism. Implementing structured exercise routines could help individuals with autism to practice observation, imitation, and self-regulation skills, in addition to providing physical health benefits.

Oxytocin treatment, the Early Start Denver Model, social cognitive intervention, Google Glass devices, LEGO therapy, and structured exercise routines could be implemented for individuals with autism to develop their social skills and increase their social learning capabilities. This research offers promising evidence that there is a way for individuals with autism to overcome the initial challenges of social learning deficits. With the right help, these individuals can live healthy social lives with healthy attachment styles, learned fear responses, and social skills.

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