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## The Effect of Sign Language on Behavioral Problems in Children with Autism

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Autism is a developmental disorder that impairs communication skills (Kutscher, 2005). These communication problems are the root of many behavioral problems that drastically interfere with the lives of individuals with autism (Howlin, 2005). There are many different communication interventions that are used with individuals with autism. Functional communication, Picture Exchange Communication System and manual signs all improve the ability to communicate. While many studies focus on improving communication among autistic participants few look at how these interventions affect problem behaviors. Furthermore, no known studies have looked at how sign language could improve behavioral problems in the classroom. I hypothesize that teaching sign language to children with autism will improve their behavior at school.

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Today, almost one in 100 people are born with autism spectrum disorder (ASD) across the world (American Psychiatric Association, 2013). Autism causes problems with social communication and interaction (American Psychiatric Association, 2013). Autism spectrum disorder also causes repetitive behaviors, which are often problematic. These symptoms lessen the quality of life of those suffering from ASD and their caregivers (Ruef & Turnbull, 2002).

One of the primary indications of autism is problems with communication (Mirenda, 2003; Olney, 2000; Paul, 2014). At minimum, individuals with autism have trouble with non-verbal communication, initiating communication, reciprocal conversation, and understanding unwritten rules (Kutscher, 2005). More devastatingly, some people with autism struggle to use verbal language. They have difficulty understanding written or spoken words and/or expressing themselves through verbal means (Kutscher, 2005). They experience delayed speech, totally absent speech, or echolalia (meaningless repetition of vocalizations made by another person) (Olney, 2000).

Communication deficits have been found to be the root of many behavior problems that those with autism face (Howlin, 2005). Ruef and Turnbull (2002) interviewed nine

participants with various disabilities, four of whom were diagnosed with autism. Some participants reported that their difficulties communicating caused frustration which led to problem behaviors, such as tantrums, screaming, and self-injurious acts. Of those with autism, two had a support person with them 24 hours, one was semi-independent and the last was completely independent. Participants had assistance from family or caregivers in understanding and answering questions during the interview. Two of the participants with autism described how their inability to communicate effectively caused inappropriate behaviors. One participant described how he would pull out his hair and eat it when he could not express himself to his mother. Another participant would start yelling when he felt people were talking angrily at him or when they were not able to help him. Authors concluded that without successful intervention, the inability to communicate efficiently leads to behavior problems for people with autism.

Since people with autism exhibit behavior problems, autism spectrum disorder became known as a behavioral disorder in the 1960s (Howlin, 2005). Once autism became a behavioral disorder, treatments started to focus on ridding sufferers of undesirable behaviors such as tantrums, aggression and self-injury (Howlin, 2005). Many interventions have been tried over the years to help those who suffer from autism (Howlin, 2005; Vismara & Rogers, 2010). Structured

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educational programs, early intensive behavioral intervention, auditory integration training, psychoanalytic psychotherapy and floor time are some interventions used (as reviewed in Howlin, 2005). Other non-conventional interventions include gentle teaching, facilitated communication, movement therapy, music therapy, pet therapy, holding therapy, and cranial osteopathy (as reviewed in Howlin, 2005). Although many behavioral interventions have been used to help ease symptoms of autism, there is no consensus on which one works best for the majority of people with autism spectrum disorder.

Recently, a different kind of intervention started to become more popular among those working with individuals with autism. Communication interventions have started to gain more interest among researchers and caregivers because they help, not only with general communication, but also with social and behavioral problems. Factors such as wanting something to eat or drink, or needing help can all lead to behavior problems for someone with autism if they are unable to communicate (Tock, 2011). Using language is a way to control one's environment; therefore, communication interventions can decrease behavioral problems (Goldstein, 2002; Jennett, 2014). Some communication interventions that yield positive results for those with autism are manual graphic symbols, functional communication training, and manual signing (Mirenda, 2003).

An example of manual graphic symbol use is the Picture Exchange Communication System (PECS). PECS works by providing small pictures that one can pick up and give to the caretaker to express themselves in a nonverbal manner. PECS has been shown to help develop spontaneous speech, increase social-communicative behavior, and ease problem behaviors (Charlop-Christy, Carpenter, Le, LeBlanc, & Keller, 2002).

Charlop-Christy et al. (2002) studied three boys with autism who had not been able to learn to communicate from speech training. The boys' ages ranged from 3 to 12 years old. Before training began, students were observed and tested to see how much they currently used language and experienced problem behaviors. During the training period, each child was independently taught the PECS for 15 minutes twice a week. The students were taught in empty rooms in their school and at home, with the hope that they would generalize what they were learning to all environments. Throughout the study, and at the end of training, students were observed and tested. Results of the study revealed that the PECS increased spontaneous speech, imitation and length of utterance in all participants. Furthermore, behavioral problems decreased significantly after the PECS training, again showing that communication and behavior problems are correlated.

Another communication intervention that has been shown to greatly reduce problem behavior in children with autism is Functional Communication Training (Carr & Durand, 1985; Durand & Carr, 1991). Similar to the PECS, Functional Communication Training is used to help those who have trouble communicating by providing a way to express they need help, want attention or do not understand. Carr and Durand's (1985) study consisted of four participants with autism who demonstrated poor communication skills and behavior problems. Over the course of the experiment they were each taught simple

mands (requests) that focused on the source of their behavior problems. Students who acted out in order to gain attention were taught to ask "Am I doing good work?" Students who acted out because they needed help were taught to say "I don't understand". At the end of the training students' behavioral problems were significantly reduced.

In another experiment, Durand and Carr (1991) found that functional communication training was maintained easily and applicable to new settings. This study involved three boys with frequent, severe and chronic behavior problems. All three participants also had poor communication skills. This study used the same procedure as Carr and Durand (1985), however it involved long-term testing and observation of participants in a variety of environments. Follow-up testing found that two of the three boys had decreases in behavioral problems and were able to communicate better. In contrast, the third participant was not pronouncing his statements in ways that others could understand, thus causing an increase in his behavioral problems. The experimenters retrained this participant in order to reinforce how to pronounce certain words and then his behavioral problems decreased.

Sign language is another communication intervention that has been found effective with people with autism (Paul, 2014; Simpson & Lynch, 2007; Tincani, 2004; Toth, 2009). Sign language and manual signing, work well for people with autism because signs are a form of visual models. Visual models are easier for people with autism to understand because they are more concrete, and they do not lead to overstimulation as can verbal communication (Goldstein, 2002; Tock, 2011). Furthermore, manual signing only needs one stimulus compared to other forms of communication intervention that need multiple stimuli (Sundberg & Partington, 1998). Similarly, signing is easier than other communication interventions because the child only needs to perform one action, forming the sign (Michael, 1985; Potter & Brown, 1997). Many studies have discovered that sign language is beneficial for both disabled and non-disabled people, regardless of age.

Heller, Manning, Pavur, and Wagner (1998) found that sign language enhances vocabulary skills for students who are not on the autism spectrum. Researchers studied 54 three year old students: 29 were in the signing group and 25 were in the control group. After one year of having been exposed to total communication (sign language and voice) in their classrooms the students in the experimental group had a significant change in their vocabulary skills, suggesting that sign language improves vocal language development. Similar effects have been demonstrated with children on the autism spectrum (as reviewed in Goldstein, 2002).

More recently, Toth (2009) showed that total communication improved vocabulary, behavior, and social interactions for students with disabilities. Thirty-eight participants, aged 0-6 years old, all with communication problems and other disabilities, were taught sign language through the Bridge of Signs program. The students were shown a DVD that used total communication. The same communication skills were reiterated at school and at home.

Results suggested that children had better social and behavioral skills after learning total communication.

Sign language is equally, if not more effective, as the PECS at teaching mands to children with autism (Tincani, 2004). Tincani (2004) trained two children diagnosed with autism and mental retardation in both sign language and PECS. He counterbalanced days of the week, time of the day, order of presentation, and person delivering treatment to control for extraneous variables. Tincani (2004) found that if a learner has hand-motor imitation skills, sign language is equally, if not more effective, than PECS. Furthermore, sign language produced more vocalization, suggesting that signing may be a self-prompt for vocalization. Due to the connection between communication and behavior, and the ease of sign language, it may be a communication intervention that can help diminish problem behaviors.

A more recent study has shown that sign language reduces behavioral problems in students with autism while they are in vocational settings (Tock, 2011). In this study, two male high school students with autism who displayed unwanted behaviors during their vocational period were studied. Both students displayed the undesirable behaviors of non-work related talk and repetitive questioning. Participants and their supervisors were trained in signs that related to their job tasks. After the training, participants were better able to follow directions without getting distracted or displaying the aforementioned problem behaviors.

People with autism experience severe difficulties in communication. Past research suggests that behavioral problems may stem from this inability to communicate (Durand & Merges, 2001; Howlin, 2005; Lecomer, 2006; Ruef & Turnbull, 2002; Tock, 2011). Furthermore, research suggests that sign language may be a more effective communication intervention than PECS (Tincani, 2004). Therefore, I propose to examine how sign language can improve problem behaviors in young (6-11 year old) students with autism. I hypothesize that after learning how to express oneself through sign language children with autism will show less problem behaviors.

## PROPOSED METHOD

### *Participants*

The sample for this study will consist of one hundred children aged 6-11 years old with autism spectrum disorder. Participants will only be accepted if they have a receptive vocabulary age that is at least five years behind their chronological age. Participants must also have hand-motor imitation skills required to form signs. Participants will be recruited from four schools that specialize in autism spectrum disorder. Informed consent will be received from the parent. Demographic characteristics of age and biological sex will be collected.

### *Procedure*

Once consent is received from the parents of participants who meet the criteria, children will be randomly assigned either to the control or experimental group. A pre-test of the participants' problem behaviors will be done using subsections from the Childhood Autism Rating Scale – Second Edition (CARS-2) (Schopler & Van Bourgondien, 2010). The Childhood Autism Rating Scale – Second Edition measures symptom severity in children with autism. The subsections that will be used from CARS-2 measure: relating to people, social-emotional understanding, adaption to change, and fear or nervousness. Improvements in one's behavior will lead to improvements in these subsections. Those in the experimental group will be taught to use sign language through the Bridge of Signs program (from Toth, 2009), and their teachers will use total communication in their classrooms. Those in the control group will go through their everyday activities and lessons unchanged.

The Bridge of Signs program consists of a DVD of an instructor showing a sign and verbalizing the word. Parents will have access to the Bridge of Signs DVD so that if participants use signs at home their parents can understand them. The participants will view the DVD once every other week for the first three months of the experiment. During this time, teachers will use the signs from the DVD and other signs in which teachers will be trained, teachers will also verbalize while instructing. After three months the teachers will continue using total communication (voice and sign language) but the participants will no longer watch the DVD.

After six months, all participants will be re-tested using CARS-2 to evaluate whether behaviors have improved. The improvement in behaviors between those in the control and those in the experimental groups will be analyzed to determine whether the training in sign language made an improvement in behavior problems, and which areas showed the most improvements. A follow-up test will also be given a year after the experiment is finished to determine whether behavior changes lasted.

## CONCLUDING REMARKS

### *Limitations*

There are several limitations to this study. First, the results from this experiment cannot be generalized to situations outside the school setting. Another limitation is that this study will only look at participants that are 6-11 years old, therefore the results cannot be generalized to the whole population. Furthermore, the length of the study is six months long so there may be some participants who drop out, and other participants who cannot be reached for a follow-up test a year later. Finally, although the participants will be randomly assigned to groups, it is not possible to know that all variables will be controlled for.

### *Significance*

The results of this study will contribute to the field of psychology and autism research. Autism is a growing disorder

among the population. Autism inhibits one's ability to communicate and creates behavioral problems (Durand & Merges, 2001; Howlin, 2005; Lecomer, 2006; Tock 2011). These symptoms make life difficult for these individuals in social, work and school situations. Future research should look at different ages and a wider variety of environments, to see how far the benefits of sign language extend. Sign language may help improve behavioral problems among those with autism, which can increase one's quality of life.

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