

DECREASING SELF-INJURIOUS BEHAVIORS IN CHILDREN WITH ASD

Decreasing Self-Injurious Behaviors in Children with Autism Spectrum Disorders

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Children with autism spectrum disorder (ASD) exhibit a unique collection of symptoms. These include deficits in the areas of socialization, communication, and interests and activities. A person with ASD may have a narrow range of interests that involve restricted behaviors and the tendency to persevere on a single topic or activity. Patterns of repetitive and restrictive behaviors, described as stereotypies, often develop that serve multiple functions for a child (Heflin & Alaimo, 2007). Self-injurious behaviors (SIB) are common in children with ASD according to research by Baghdadli, Pascal, Grisi, and Aussilloux (2003). Their findings show that 50% of children in the study experienced SIB, with 14.6% at severe levels. These behaviors can have far-reaching consequences and may restrict children from reaching their full potential.

There has been increased concern in developing successful interventions for problem behaviors in ASD due to a rise in diagnoses of this disorder (Doughty & Doughty, 2008). This paper will explore applied behavior analysis research studies that have examined interventions used in the attempt to decrease or extinguish SIB in children with ASD. Procedural alternatives for behavioral reduction will be investigated and the results of research will be evaluated for significant influence on SIB. These include reinforcement-based strategies, extinction strategies, removal of desirable stimuli, and the presentation of aversive stimuli. The functional relationship between SIB and these alternatives for behavior reduction will be summarized. Possible interventions will be proposed and future research will be recommended.

Self-Injurious Behaviors

The Repetitive Behavior Scale-Revised (RBS-R) is based on a questionnaire that examines repetitive and restrictive behaviors in autism. One of the six sub-scales is self-injurious

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behavior (SIB), defined as "actions that cause or have the potential to cause redness, bruising, or other injury to the body" (Lam & Aman, 2007, p. 856). Included in this sub-scale are eight behaviors: hits with body; hits with object; pulls hair/skin; hits against surface; picks skin; bites self; rubs/scratches; and inserts finger/object (Lam & Aman, 2007). A common SIB is skin picking, defined as "the scratching or picking of healthy skin...often producing tissue damage, infection, and potential scarring" (Ladd, Luiselli, & Baker, 2009, p. 55).

Repetitive behaviors may cause significant impairments to children with ASD that can consume their waking hours and interfere profoundly with daily life. Some behaviors are considered socially inappropriate and may even become stigmatizing to a child. SIB in particular can have short and long term damaging effects on a child and impact the entire family. The most serious effects are tissue damage, disfigurement, health risks due to infection, and stigmatizing consequences (Humenik, Curran, Luiselli, & Child, 2008).

A study by Baghdadli et al. (2003) sought to identify risk factors for SIB among children with ASD. The results showed a correlation between SIB and lower chronological age, higher degree of ASD, and lower daily living skills. These variables may be helpful in predicting the occurrence of SIB. This may also reinforce the idea that maladaptive behaviors raise the risk of SIB in children with ASD (Baghadadli et al., 2003).

Functions of Self-Injurious Behaviors

The four functions of behavior also apply to SIB. These functions are attention, escape or avoidance, access to tangible items, and self-stimulation. Because SIB is a major concern for the population of children with ASD, early intervention is beneficial to prevent more acceleration of damaging behaviors. The first step in preventing harmful behavior is to assess its functions. It

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must be noted that research shows there may exist multiple functions of SIB in children with ASD. Sometimes the functional behavior assessment does not result in a clear indication of a behavior's function (Wachtel et al., 2009).

Attention: SIBs are often maintained by the attention function. Even behaviors that do not begin as social behaviors can develop into social attention functioning behaviors if they are continuously being reinforced by attention (Mahatmya, Zobel, & Valdovinos, 2008). Although SIB maintained by the attention function are plentiful, these behaviors are usually the easiest to change (Humenik, et al., 2008).

Escape: Children with ASD often need accommodations in the classroom in order to be academically successful. Many maladaptive behaviors make academic tasks difficult to master. Because of these issues, they often seek to avoid or escape from school work. A study by Soares, Vannest, and Harrison (2009) found that an antecedent for SIB was the instruction from a teacher to work on academic assignments. Other things can act as antecedents that may contribute to the escape function of SIB. This can include people, events, environmental factors, or a desire for a different activity (Banda, McAfee, & Hart, 2009). If SIB provides a successful escape, the behavior is being negatively reinforced, which forms a contingency between SIB and escape consequences.

Tangible items: Everyone performs behaviors to get something. People go work in order to get a paycheck. Children with ASD sometimes engage in SIB in order to gain tangibles such as food, drink, toys, or other items that serve a purpose for them. Humenik et al. (2008) showed that a girl with ASD drastically lowered her rate of SIB when given continuous access to preferred food. Another illustration of this function of behavior is shown in an ABAB designed

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research study involving a thirteen-year-old boy with Asperger Syndrome. When the student was given access to a computer screen with his favorite cartoon character, his rate of SIB decreased and on-task behaviors increased (Soares et al., 2009).

Sensory functions: Some behaviors are not reinforced by attention, escape, or tangible items, and instead are the function of sensory reinforcement. Behaviors maintained by sensory functions are often resistant to intervention (Neitzel, 2010). This is evidenced in an ABAB reversal design analysis of a nine-year-old girl with ASD who continually picked her fingers, resulting in deep tissue damage. The results of the functional behavior analysis showed no relationship between the SIB and any social contingencies. The SIB provided the girl pleasurable sensory stimulation, which acted as an automatic reinforcement (Ladd et al., 2009). Sometimes SIB is maintained by the behavior itself. This is also known as stereotypical behavior which is often caused by sensory disturbances (Doughty & Doughty, 2008).

Procedural Alternatives for Self-Injurious Behaviors

Research supports a behavioral approach to treatment of SIBs. A key consideration is "determining the function of SIB and selecting treatments based on these functions <which> is paramount for successful treatment" (Mahatmya et al., 2008, p. 107). Functional behavior assessment and analysis help to identify the function of SIB and to formulate individualized intervention strategies for children. Most methods emphasize positive interventions that manipulate the antecedents that set the occasion for SIB (Humenik et al., 2008). Any intervention should examine the relationship between antecedents, behaviors, and consequences on an individual basis. The results of the functional behavior assessment should guide the interventions (Mahatmya et al., 2008).

Intervention based on the principles of applied behavior analysis has been effective in

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reducing and sometimes eliminating SIB in children with ASD. The process can be time consuming for teachers who must perform assessments, then implement and monitor the interventions in the classroom. This becomes a challenge for teachers because individually designed interventions are necessary (Soares et al., 2009). Many biological and psychological theories have been developed to explain SIB in children with ASD, so a multitude of treatments exist (Wachtel et al., 2009).

It should be noted that the research on SIB shows a concern for the safety of the participants in their studies. Because of this, response blocking is sometimes implemented during behavior analysis procedures, to prevent further injuries to the children (Doughty & Doughty, 2008). Therapists may also incorporate the use of restraint systems during the analyses (Wachtel et al., 2009).

Reinforcement-based strategies

Reinforcement-based strategies include non-contingent reinforcement, differential reinforcement of alternative behaviors, less-occurring behaviors, or other behaviors. They incorporate stimulus presentation or removal contingent on the behavior. These strategies are often used for interventions regardless of the function of the SIB, alone or in conjunction with other procedures (Alberto & Troutman, 2009).

The reinforcement of alternative behaviors has shown to be successful in decreasing the rate of SIB in children with ASD. These can be entirely different behaviors, modified behaviors, or behaviors stimulated by new antecedents. When dealing with SIB, differential reinforcement of incompatible behaviors is commonly used as the first intervention. An ABAB reversal design

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study by Ladd et al. (2009) presented a nine-year-old girl with ASD who displayed severe skin picking, primarily on her fingers, which resulted in tissue damage. The authors looked at whether an alternate behavior would reduce SIB by using an antecedent intervention that the child could use independently. They found that SIB occurred most often during unstructured time and determined the function of this behavior was automatic reinforcement of sensory stimulation. With the intervention of providing an object to hold during play and leisure activities, the percentage of intervals for SIB decreased from 57% to 9%. This alternate activity successfully competed with the consequences of the sensory stimulation she was receiving from her SIB. Holding the object made the SIB incompatible and interfered with her skin picking (Ladd et al., 2009).

Sometimes the introduction of an alternate reinforcer can reduce the occurrence of SIB. An interesting research study of Kerth, Progar, and Morales (2009), used an ABAB reversal design to study the use of self-restraint as an intervention for SIB in children with ASD. The functional analyses conducted suggested that SIB was maintained by access to tangibles and escape from attention. A sixteen-year-old boy with ASD and moderate intellectual disability engaged in self-scratching, head banging and self-biting. When given a hooded sweatshirt, his SIB was reduced by 54%. As noted in the article, the use of clothing is a socially acceptable alternative behavior that a child could use to help decrease SIB. Although self-restraint itself is considered a form of SIB, the results of this study cannot be disregarded. They both may be used by a child as a function of avoidance or escape. However, as an intervention to reduce the harm of SIB, this self-restraint using a sweatshirt has a more positive consequence. One limitation on this intervention would be the practicality of wearing a sweatshirt on a hot day (Kerth et al., 2009).

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Teachers are always looking for unobtrusive interventions they can use in the classroom for students with ASD. Soares et al. (2009) conducted an ABAB design research that used self-monitoring activities as an alternative behavior that not only decreased SIB in a student, but also improved classroom performance. A thirteen-year-old boy with Asperger Syndrome was taught to self-monitor his academic work in a middle school classroom by using a computer program. As he completed assignments, he entered these into the computer and was rewarded with pictures and animations of his favorite cartoon characters. The computer helped the student become aware of his behaviors and increase his attention to his academic work. The use of an alternative behavior was also successful for assisting the student in generalizing these behaviors across school settings. In the second intervention phase of the study, the student had a 92% rate of work completion and only a 1.5% severity rating for his SIB (Soares et al., 2009).

Giving students choices is another form of reinforcement of alternative behaviors. An ABCB alternating treatment design by Humenik et al. (2008) showed that choice making was effective in reducing SIB in children with ASD. This is an often overlooked option for students with ASD that is easy to implement in the classroom. It can also be embedded into instruction for maintenance and generalization and does not take a lot of time or money. In this study, a seven-year-old girl with ASD engaged in SIB which consisted of striking her face and head with her hand over 300 times a day. A functional assessment suggested that the SIB was maintained by attention and escape from academic tasks. The first intervention consisted of a choice of continuous access to preferred food. This decreased the frequency of her SIB from a mean of 39 to a mean of 1.0 occurrences per ten-minute interval, an astounding reduction (Humenik et al., 2008).

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Children with ASD benefit from having routines to decrease challenging behaviors. Schedules can help students predict their daily activities, especially when there are any changes to their routine. These can be created for individual students based on their goals and expectations. An ABAB design research study by O'Reilly, Sigafos, Lancioni, Edrisinha, and Andrews (2005) used schedules as an intervention to decrease SIB in a twelve-year-old boy with ASD. An added benefit of the schedules was the increase in academic engagement. The student engaged in behavior which included slapping his face, mostly during academic demand conditions. When his work sessions were reduced to five-minute intervals, interspersed with periods of an interaction, his rate of SIB dropped to less than 10% of the intervals. Student engagement rose to 70% of task intervals, and was generalized to other classes. The alternate schedule of work provided a schedule of academic tasks that successfully reduced the student's SIB (O'Reilly et al., 2005).

Extinction

Extinction strategies are more successful when used with a differential reinforcement plan while attempting to terminate the reinforcement of an inappropriate behavior (Alberto & Troutman, 2009). A study by Banda et al. (2009) showed a significant decrease in SIB with the combination of contingent attention and extinction. The functional assessment of a thirteen-year-old boy with severe ASD and Tourette Syndrome showed no clear function for his SIB, although the behaviors were near zero during recreation conditions. The authors used an ABAC design to evaluate interventions that would affect the child's SIB. These included extinction by ignoring and turning away from student when he engaged in SIB. He was also reinforced for other appropriate behaviors at the same time. The results of the behavior analysis showed that

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during the last intervention phase, SIB dropped to a low of 3.5 hits per minute and dropped to a zero rate by the end of the session. After the intervention was instituted, the student was able to generalize his behaviors by showing less aggressive behaviors toward others and worked more consistently at school and home (Banda et al., 2009).

Sensory extinction consists of withdrawing reinforcement for behavior maintained by sensory stimulation. This often involves replacing the stimulation with another, socially acceptable stimulation. An A-B design research study by Doughty and Doughty (2008) used a weighted vest as a stimulus replacement for a fourteen-year-old boy with ASD and Tourette syndrome who engaged in head banging and chin hitting, resulting in tissue damage, swelling, contusions, and bleeding. The guidelines for weighted vests are for them to be about five percent of the child's weight, so the vest used was four and a half pounds. The hypothesis is that the weighted vest blocked the sensory input so he didn't feel the need to injure himself as much. Although the vest was intended as a tool for extinction of SIB, what it really ended up being was a preferred tangible that helped to replace the SIB. In this case, no definite function was found for the child's SIB (Doughty & Doughty, 2008).

Removal of Desirable Stimuli and Presentation of Aversive Stimuli

The removal of desirable stimuli and presentation of aversive stimuli are interrelated in that the research looks at them in relation to each other. Response interruption and redirection is used to decrease SIB, especially those that are sensory maintained. Some behaviors that are reinforced by sensory reinforcers are resistant to intervention (Neitzel, 2010). Response interruption stops the child from performing an inappropriate behavior (SIB) and redirection prompts the child toward an appropriate behavior. Physical and verbal blocking of SIB presents

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an aversive stimuli that poses an unpleasant situation for the child, who will then seek an alternative behavior to avoid the unpleasantness. In this case the desirable stimuli (SIB) will be removed in the presence of an aversive stimulus. An example of this is having a student carry heavy books to another classroom in order to stop him from running or flapping in the hall (Neitzel, 2010).

A research study by Wachtel et al. (2009) followed an eight-year-old boy diagnosed with ASD and intellectual disability who performed SIB to his head at an average daily rate of 109 hits per hour. The child led a very restrictive existence where he was continuously placed in restraints and padding for his own protection. This impacted all aspects of his life and he was never able to participate in any learning activities. He had no social or family life or self-care skills. Multiple reinforcement-based interventions had been used, including functional communication training. Response reduction restraints were in place to prevent him from further damage to himself. The intervention discussed in this article involved the use of Electroconvulsive Therapy (ECT). As a last resort, therapists used a bitemporal electrode placement using 56 millicoulombs (mC), with 15 treatments over five weeks. This intervention can be considered the removal of a desirable stimulus because it is attempting to remove the SIB. It could also be considered a presentation of aversive stimuli since the child is receiving electroconvulsive therapy into his brain. In either case, this study showed miraculous results after one treatment. The child sat up in bed, smiled, got up and walked around with no SIB. He had consistent reductions in SIB over the five weeks of treatment. SIBs were reduced from 100.6 SIB per hour to 6.5 SIB per hour. The child was finally able to have a functional life,

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including educational activities for the first time in his life. An MRI showed no changes on his brain from the ECT. This intervention dramatically improved the child's quality of life and his chances of reaching his full potential. Although ECT does pose side effects, in this case the benefits far outweigh the risks (Wachtel et al., 2009).

Discussion

The results of these research studies show many options of interventions for children with ASD who experience SIB. An important first step is to conduct the functional behavior assessment in order to form a hypothesis of the function of the behaviors. A behavior analysis will disclose the relationship between the SIB and the antecedents and consequences of the behavior. Then an intervention plan can be developed that is specific for the individual. Educational professionals can use assessment to inform interventions in academic settings. There are many procedures that can be adopted for use in the classroom.

Most of the research on interventions for SIB include some reinforcement strategies, along with other methods to reduce the behaviors. The reality is that there is no single intervention to prevent or decrease SIB in children with ASD due to the individualized characteristics of the child and the behavior. ASD presents in a broad spectrum of features and SIB can present itself in many different aspects. The key is to base the intervention on the results of the functional behavior assessments, when the functions of the behaviors are known.

The articles reviewed for this paper recommend further research of the intervention they examined. This would be beneficial for all these single subject design studies. If an intervention was implemented in a different setting, with a different student, it may be possible to evaluate

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whether the conditions could be duplicated. This would give the intervention validity for generalization, therefore, showing a greater possibility of being successful for other practitioners and teachers. It is my professional opinion that a single subject alternating treatment design would help to measure the impact of more than one intervention at a time on a student engaging in SIB.

There is a need for future research to identify possible interventions for preschool aged children who exhibit SIB. Early intervention could make a big difference in the ability of these children to attend school and lessen the effect that these behaviors can have on academic success. The ECT intervention that was a part of this research needs to be studied further to consider possible implications in interventions for SIB. Although this is a controversial procedure, it appears to have produced some positive outcomes. Additional cases could be investigated to review similar conditions and determine what interventions were successful.

In this era of No Child Left Behind and inclusion being the standard, educational professionals should be aware of the possibilities available for their students and to act as an advocate to keep students in the classrooms. The national No Child Left Behind standards and the regulations mandated by the Individuals with Disabilities Education Act dictate the use of research-based instructional strategies in instruction. If these interventions can be incorporated in the classroom, students may have less interfering behaviors and increased time for academic tasks. The goal for our students with special needs should be for them to reach their full potential; academic and otherwise. If we can find strategies to successfully help decrease SIB in our students with ASD, we can help them meet higher expectations and attain a higher quality of life now and in their future.

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