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Behavioral Interventions for Aggressive Behaviors in Students with Autism Spectrum Disorder

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Chapter 1: Introduction

Behavioral interventions are positive and proactive strategies to help students with Autism Spectrum Disorder (ASD) gain behavior management skills. Behavior affects how students succeed in the classroom both academically and behaviorally. This review examines the positive effects of behavioral interventions for aggressive behaviors in students with ASD. Research states that physical aggression is more prevalent in individuals with ASD compared to any other developmental disabilities or typically developing peers (Fitzpatrick et al., 2016).

Aggression is characterized as behavior that is threatening or likely to cause harm (Fitzpatrick et al., 2016). The behavior does not always have to be physical (e.g., hitting, biting, or throwing objects at another person); it can also be verbal (e.g., threatening or cursing at another person) (Fitzpatrick et al., 2016). "A person can demonstrate one form of aggressive behavior or many, with variable frequency, intensity, and duration" (Fitzpatrick et al., 2016, para. 3). Throughout this research, I define terminology needed to create a better understanding of behavioral interventions specifically for students with ASD and present challenging behaviors.

Definitions

*Applied Behavior Analysis (ABA): "*Developed and researched by psychology and competently applied in the treatment of various disorders based on that research, is clearly within the scope of the discipline of psychology and is an integral part of the discipline of psychology" (APA, 2017, para.1).

*Autism Spectrum Disorder (ASD): "*Developmental disability can cause significant social, communication, and behavioral challenges" (Center for Disease Control [CDC], 2020, para. 1).

Behavior Intervention Plan (BIP): "Outline strategies and tactics for dealing with the problem behavior and the role educators must play in improving student learning and behavior" (Killu, 2008, p. 140).

*Echolalia: "*Children repeat or echo the utterances of others" (Shield et al., 2017, p. 1622). Its occurrence in individuals with autism is higher than any other disability area.

*Functional Behavior Assessment (FBA): "*A structured data gathering process an IEP team uses to help identify positive behavior interventions and supports to be used in the school" (PACER, 2015, para. 1).

Individual Education Plan (IEP): "Each public-school child who receives special education and related services must have an Individualized Education Program (IEP). Each IEP must be designed for one student and must be a truly individualized document. The IEP creates an opportunity for teachers, parents, school administrators, related services personnel, and students (when appropriate) to improve educational results for children with disabilities. The IEP is the cornerstone of quality education for each child with a disability" (Price-Ellingstad et al., 2000, p. 1).

Overcorrection: An individual will practice positive behavior techniques based on the performance of undesired behaviors.

Restitutional Overcorrection: Example: “if Johnny overturned a chair, he was required to not only straighten his own chair but also to rearrange all of the chairs and tables in the classroom” (Foxx & Meindl, 2007, p. 90).

Positive Practice overcorrection: Example: “if Johnny made a loud noise in the hallway while walking to the cafeteria, he was required to practice several trials of walking quietly in the hallway” (Foxx & Meindl, 2007, p. 90).

Positive Behavioral Interventions and Supports (PBIS): Is an evidence-based three-tiered framework for improving and integrating data, systems, and practices affecting student expected outcome. It is a way to support everyone–especially students with disabilities–to create schools where all students are successful (Positive Behavioral Interventions and Supports [PBIS], 2020).

Response Cost: If a target behavior was displayed, immediate removal of a reinforcer would occur (Foxx & Meindl, 2007).

*Social Stories: “*Social learning tool that supports the safe and meaningful exchange of information between parents, professional, and people with autism of all ages” (Gray, 2021).

Autism Spectrum Disorder (ASD) Criteria

The Centers for Disease Control and Prevention (CDC, 2020) estimated that one in 54 children around the age of 8 are identified with autism. More children at younger ages are being recognized as autistic in 2020 compared to 2016 (CDC, 2020). "Autism Spectrum Disorder is a neurodevelopmental disorder characterized by persistent difficulties in social communication and social interaction, coupled with restricted, repetitive patterns of behavior or interest" (Fitzpatrick et al., 2016, para. 1). According to the Centers for Disease Control and Prevention, to meet the

criteria for ASD, a child must show deficits in each of the three areas of social communication and interaction which, are;

1. Deficits in social-emotional reciprocity, for example, from abnormal social approach and low conversational skills; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions (CDC, 2020).
2. Deficits in nonverbal communicative behaviors used for social interaction, for example, from poor verbal and nonverbal communication skills; to limited eye contact and not being able to recognize body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication (CDC, 2020).
3. Deficits in developing, maintaining, and understanding relationships, such as difficulties adjusting behavior for various social situations to difficulties in sharing, imaginative play, or making friends; to the absence of interest in peers (CDC, 2020).

A child must also show deficits in at least two of the four types of restricted, repetitive behaviors which, are:

1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor activities (fine and gross), lining up toys, echolalia, idiosyncratic phrases) (CDC, 2020).
2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior (e.g., extreme distress to minor changes, transition

difficulties, rigid thinking, need to take the same route or complete the same routine) (CDC, 2020).

3. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to unusual objects, excessively perseverative interests) (CDC, 2020).
4. Hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment (e.g., indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement) (CDC, 2020).

Functional Behavior Assessment (FBA)/Behavior Intervention Plan (BIP)

All students have the right to receive free and appropriate education and have the right to an Individualized Education Plan (IEP) that meets their specific needs. A student's IEP will often include modifications and accommodations to best suit each student's needs academically and behaviorally. For students with more challenging behaviors, the IEP team will take further steps. A behavior analyst or special education teacher will create a Functional Behavior Assessment (FBA). An FBA is a problem-solving process to understand the functions of the behaviors that are occurring. Why does the student have challenging behavior? What reinforces problematic behavior? What positive interventions help decrease challenging behavior and increase the desired behavior? (PACER, 2015). The FBA includes gathering data from observations and data collection. FBA information is collected to develop a Behavior Intervention Plan (BIP). BIP's outline strategies for dealing with undesired behaviors (Killu, 2008). The BIP is created within the student's IEP. It includes positive and proactive approaches to help students succeed in the

classroom both academically and behaviorally. The BIP reinforces the correct behavior. It consists of the following information: identification of the specific behavior, when the intervention should start and how often it should be used, strategies to teach new skills to replace challenging behaviors, methods of evaluating the effectiveness of the intervention, skills training to increase the students understanding of positive behavior strategies, support to help the student practice the new strategy across different school settings, environmental changes to reduce or eliminate challenging behaviors, and a plan for addressing unsafe behavior (PACER, 2020).

Positive Behavioral Interventions and Supports (PBIS)

"Positive Behavioral Interventions and Supports (PBIS) is an evidence-based three-tiered framework for improving and integrating all data, systems, and practices affecting student outcomes every day" (PBIS, 2020, para. 1). This framework helps assist students in being successful and creates a positive environment of support. The three tiers include universal prevention (all), targeted prevention (some), and intensive individualized prevention (few). Tier 1 emphasizes a foundation for delivering regular, positive, and proactive support and preventing unwanted behaviors. It teaches social skills, along with expectations and appropriate behaviors (PBIS, 2020). Tier 2 emphasizes support for those who were not successful with Tier 1 supports. This tier focuses on supporting students at risk for developing more problematic behaviors before they start. These supports involve group interventions with anywhere from 10 to more students participating (PBIS, 2020). Tier 3 students receive intensive, individualized support to improve their behavioral and academic outcomes. Tier 3 supports work for students with developmental disabilities, autism, emotional and behavioral disorders (PBIS, 2020). This

system is committed to addressing student behavior and improving academic and social aspects when implemented.

Research Question

The research question I address in this paper is:

1. What behavioral interventions provide the most effective ways to reduce aggressive behaviors in students with Autism Spectrum Disorder?

Importance of the Topic

Often, students who have ASD have limited communication skills. Those defined communication skills cause physically aggressive behaviors. Sometimes this aggression is shown in multiple forms such as aggression toward another peer, aggression toward a parent/guardian or caregiver, aggression towards school personnel, or self-injurious behaviors. These physically aggressive behaviors can occur due to lack of communication skills (not communicating wants or needs appropriately), trouble understanding what is happening around them, sensory stimuli, stress, fear, or anxiety. Aggressive behaviors can come in multiple different forms such as: emotional (e.g., crying, refusal, screaming), property destruction (e.g., throwing objects, breaking objects, tipping a desk/table), as well as aggression (e.g., biting, hitting, kicking, punching). An FBA first determines the functions of the behaviors that are occurring. A BIP is then created into the student's IEP to allow for consistency, which then teaches students the appropriate replacement behaviors. With the help of modifications, supports, and interventions, a safer school environment will be created for all peers and school personnel.

I currently teach in a federal setting level IV program called Rum River South, a part of the Rum River Special Education Cooperative. This program provides services to students who experience high levels of physical aggressiveness and high special education needs. Occasionally, physically aggressive behaviors result in restrictive procedures if they become a danger to themselves or anyone around them. These restrictive procedures are used as a last resort. Before a restrictive procedure, the team provides intensive interventions to decrease problematic behaviors such as physical aggression or property destruction. The FBA and BIP come into play to determine the most effective interventions for a particular student. What is the function of that behavior, and how can we teach appropriate replacement behaviors? In determining the most relevant and effective behavioral interventions for students with ASD, we will then have the ability to decrease the number of restrictive procedures.

Chapter 2: Review of Literature

This chapter reviews literature that examines positive, proactive, and effective behavioral interventions designed to decrease aggression in students with autism. Eight chronological studies are presented in this that contain interventions described in the previous chapter.

Behavioral Intervention Studies

Richard. Gerhardt et al. (2003) described a two-part intervention addressing severe aggressive behaviors shown by an 18-year-old named Richard with autism. “The two components of the intervention included: Noncontingent Reinforcement and Functional Communication Training” (Gerhardt et al., 2003, p. 386). During the intervention, Richard attended a Community Transition Program which was an Applied Behavior Analysis Program. Richard was placed in this program due to multiple unsuccessful educational placements. This was because of his severe aggression, which had resulted in numerous hospitalizations of several staff members. Richard was nonverbal and communicated through the use of a picture symbol communication device.

This study aimed to determine the impact of noncontingent reinforcement on Richards's severely aggressive behaviors. It was paired with a very dense schedule along with highly preferred reinforcement items. Based on assessment information received from parent interviews, review of previous records, and observations, it was determined that Richard’s aggression would get divided into two categories: aggression and high aggression. “Aggression was defined as an individual instance of hitting, kicking, or grabbing another person. High aggression was defined as more than one aggression occurring within a ten-second interval or any biting and attempts to bite” (Gerhardt et al., 2003, p. 388).

On Richard's first day of assessment, data aggression occurred 95 times; three of those times were considered high aggression averaging 17 minutes. Two variables were determined while assessment data were being collected. One variable being the physical approach by staff, and the second being restricted access to tangible items. With the results collected during the assessment, two strategies would be implemented during the 13 weeks of intervention: noncontingent reinforcement (NCR) and functional communication training (FCT).

Noncontingent Reinforcement

This noncontingent reinforcement intervention was chosen for several different reasons. (1) Food was found to be reinforcing, (2) easy implementation and has a low probability of adverse side effects, (3) would provide the opportunity for pairing staff approach with positive reinforcement.

Functional Communication Training

The functional communication training intervention was chosen to teach Richard to request avoidance with a raised hand. This response could be shaped, and it resembles his current response when he engages in aggression, raising his hand/arm. Staff members would be trained to immediately interrupt any aggression attempts when Richard would raise his hand/arm. Staff would then use a "phrase such as, 'you want me to leave the room, that was great telling me,' and then leave the room. staff returned to deliver reinforcement information as per the NCR schedule" (Gerhardt et al., 2003, p. 389). Eventually, staff would reinforce smaller movements until Richard consistently raised his hand.

During the 13 weeks of intervention, Richard was in school for 5.5 hours per day. During 55 days of intervention, Richard engaged in 10.24 aggressions per day with an average of less

than one high-level aggression per day. In a range from day 2 to day 21, he averaged 7.25 aggressions per day and 0.35 high-level aggressions. During week 6, there was an increasing trend in the frequency of Richard's aggression. After additional assessment data were collected and observations were completed, it was determined that staff members delivering highly preferred items contingent on the absence of aggression rather than non-contingently. This resulted in additional staff training. Following staff training, aggressions dropped to previous levels.

Johnny. A program was developed by Foxx and Meindl (2007) for reducing the aggressive/destructive behavior of a 13-year-old boy diagnosed with autism and disruptive behavior not otherwise specified. All other interventions have been proven ineffective, such as extinction, timeout, token economy systems, etc. The program in the following study consisted of positive reinforcement, tokens, choice-making, response cost, overcorrection, and physical restraint (Foxx & Meindl, 2007). Johnny lived at home with his parents and one older sister. He communicated through single-word statements, gestures, or simply by taking the item that he desired. Johnny's aggression consisted of hitting, kicking, biting, headbutting, pinching, and aggressing with objects such as weapons. He was aggressive toward others and destructive, breaking many things around the home and at school. Due to his aggressive behaviors, Johnny was programmed in a self-contained classroom in a public school with three other peers and several staff members. Due to his aggression, little teaching was done, and as a result, his skills steadily decreased. "The results of the functional assessment revealed that Johnny aggressed primarily to escape academic or social demands and to obtain desired items" (Foxx & Meindl, 2007, p. 87).

Baseline data were collected for 3 months, consisting of event recording to document the number of times each behavior occurred. If it was a severe instance of aggression or destruction, the antecedents and consequences of the behavior were also recorded. The current interventions being used were ignoring and redirecting him to engage in more appropriate behavior. If the behavior was dangerous to himself or others around him, he was physically restrained.

Due to the intensity of the planned intervention, Johnny was moved into a new school for only children with special needs. He was in a 30x30 room as the only student. The room contained tables, chairs, academic materials, and a computer and DVD player. Parents described the computer and DVD player as highly motivating for Johnny. It consisted of himself, a teacher, personal care assistant, and a Master's level ABA intern in Johnny's room. "The behavioral program consisted of a token economy system, differential reinforcement of other behaviors (DRO), response cost, overcorrection, and physical restraint" (Foxx & Meindl, 2007, pp. 88-89).

Token Economy System

The token economy system was only used during 1:1 instructional time. Pictures of each item were placed into a folder and given a price. Initially, each item only cost five tokens, but as behaviors started to decrease, the price of each item began to increase. Highly preferred items were now more expensive, and less desired items were less expensive. Johnny was pre-taught that he would receive tokens when he would respond correctly and behave appropriately. When he would receive all of his tokens, he would be given 5-10 minutes with the item of choice.

Differential Reinforcement of Other Behaviors (DRO)

Given a 5-minute interval with no aggressive or destructive behaviors, Johnny would be reinforced with a token. After he would accumulate five tokens, he could exchange them for a

highly reinforcing item or activity. Over time with success, interval time and the number of tokens required would gradually increase. This intervention is separate from the token economy system.

Response Cost

When Johnny engaged in a target behavior, one token would be immediately removed from both the token economy system and the DRO. If the target behavior occurred while engaging in a highly preferred item or activity, he was required to immediately stop and begin work, allowing him to earn more tokens.

Overcorrection

Restitutional overcorrection occurred when Johnny turned over or threw an object. He was not only required to overturn an object but also to straighten up the entire room. Positive practice overcorrection occurred when inappropriate behaviors occurred. If Johnny made a loud noise while walking in the hallway, he was required to practice several times walking in the hallway quietly.

Crisis Management

Physical restraints would occur whenever Johnny engaged in aggressive or destructive behaviors that posed a danger to himself or others. Johnny was placed on a mat in a supine position with one staff person restraining each arm and a third staff person restraining his legs. The restraint was held until Johnny was calm. Due to Johnny having a history of being released and immediately attacking, he must follow a set of directions before returning to his academic activities.

During the 3 months of baseline data collection, Johnny averaged 102 incidents per day. During the first month of intervention, aggressive/destructive behaviors decreased by 95% to 5.06 incidents per day. By the sixth month, aggressive/destructive behaviors decreased to 0.29 incidents per day. On day 1 of treatment, physical restraints were implemented nine times for a total of 180 minutes. On day 2, 5 physical restraints were implemented for a total of 47 minutes. On day 3, 1 physical restraint was implemented for 14 minutes. On day 4, no physical restraints were implemented. On day 5, 2 physical restraints were implemented for a total of 14 minutes. During the remainder of the first month of treatment, one physical restraint was implemented on six separate days for an average of 23 minutes. During the second month of treatment, no physical restraints were implemented, and during the remaining ten months of treatment, only six physical restraints were implemented for a total of 162 minutes. No physical restraints were implemented during the last 7 of 8 months.

The results showed that Johnny's aggressive/destructive behaviors successfully decreased and were maintained for 1 year. Not only did these behaviors decrease, but his educational progress increased tremendously. “A review of previous interventions used with Johnny revealed that less restrictive procedures were ineffective. Therefore, the use of restrictive procedures such as physical restraint, response cost, and overcorrection was justified as treatment options. As Johnny took responsibility for his behavior, his environment became less restrictive” (Foxx & Meindl, 2007, p. 95).

Ned. A program was created by Foxx and Garito (2007) to reduce the severe behavior of a 12-year-old boy with autism named Ned. Ned’s serve behaviors consisted of “aggression, self-injury, dangerous behavior, disruptive behavior, induced vomiting, and inappropriate toileting"

(Foxx & Garito, 2007, p. 69). Ned was a Romanian orphan and was adopted by his American parents at the age of 2. No records exist while Ned lived at the orphanage, but it was known that "he was kept in a cage-like enclosure and fed from a communal baby bottle" (Foxx & Garito, 2007, p. 70). Ned is somewhat verbal but is challenging to understand due to underlying speech deficits. At first, he showed no response to verbal stimuli. All other previous interventions were proven to be ineffective. "This program included a high density of positive reinforcement, tokens, choice-making, contingent exercise, and overcorrection. Treatment occurred across three sites, home, a community-based site, and a self-contained classroom in a public school" (Foxx & Garito, 2007, p. 69). It appeared as though the function of Ned's behavior was to gain attention, access different tangibles, sensory reinforcement, and escape task demands after he was admitted to an inpatient severe behavior treatment unit in 2003. After his 9 months of inpatient treatment, Ned was discharged with a recommended program.

Ned's program would consist of four phases that consisted of 1:1 discrete trial instruction using three-step guided compliance, augmentative communication device, and sensory-based occupational therapies. The program was called *Ned's Way and Our Way,* and it was divided into 15-minute segments. *Ned's way* lasted for 5 minutes and was paired with an orange card. During this time, he could engage in a reinforcing activity of his choosing from a picture book. *Our way* lasted for 10 minutes and was paired with a green card. During this time, he was expected to comply with all demands within 10 seconds. A three-step guided compliance (verbal, gestural, physical prompting) was implemented if he did not comply. Compliance received praise.

Phase 1 was considered the baseline. This occurred in a small self-contained classroom in Ned's school district. Ned was the only student in the room with a teacher, teacher's aide,

teacher's aide to collect data, and therapeutic support staff (TSS). Ned's visual schedule was posted, which consisted of two snack times, lunch, and no more than two direction instruction times per day. Staff ignored all inappropriate behaviors unless the environment became unsafe to either staff or Ned. During Phase 1, Ned's physical aggression increased, causing several staff injuries and attacking peers in the hallway on 11 different occasions. Ned would destroy his classroom, disrobe, flush his clothing down the toilet, urinate, have bowel movements in the classroom, induce vomiting, and remove his teeth. This included three permanent teeth after this program had been proven ineffective Foxx and Garito (2007) recommendation at homeschooling.

Phase 2 was first implemented at home but was then moved to a small room in a church. An essential component of Phase 2 was to decrease instructional time initially and gradually increase as behaviors improved. Reinforcement systems were created to reinforce appropriate behaviors—differential reinforcement of appropriate behaviors and a token economy system to reinforce appropriate classroom expectations. A response cost program was also incorporated with the token system. If redirection was ineffective and the behaviors were intense, aggression or self-injurious behaviors occurred, then crisis intervention methods were included.

Phase 3 was implemented in multiple settings, including his small room at the church, other areas of the church, in the community, and later, outside at a playground located at a local school. Reinforcement systems from Phase 2 were implemented in Phase 3, but they included more detail during instructional times of the day. Each token was paired with a single response. By the fifth month of this phase, Ned was attending school for a full day. Even though he was in a "highly reinforcing and less demanding environment, Ned continued to display some of the

targeted behaviors. Several procedures were added to the program" (Foxx & Garito, 2007, p. 75). Procedures that were added included: contingent physical exercise, overcorrection, and contingent movement. When Ned aggressed, he would be moved to another area where he was given a set of verbal commands to participate in gross motor movements. He was given 15 minutes to complete a series of exercises. If he aggressed during the exercise, then he would need to complete another series of exercises and would also lose any reinforcers that he had previously earned. When dangerous and disruptive behaviors occurred, such as vomiting and inappropriate toileting, Ned would be expected to clean the entire environment. If inappropriate toileting was the behavior, then Ned was expected to practice toileting with no reinforcement. If noncompliance was the behavior, then again, Ned would be expected to practice with no reinforcement. The contingent movement was applied for loud or prolonged noises during instructional times. This was a less intensive exercise involving going on a walk or running back and forth.

Phase 4 was a transition step. Ned was moved to a self-contained classroom at his home primary school. All interventions remained the same except for contingent movement, which was changed to a modified response cost system due to the stimulation of the primary school.

The program results indicated that Ned's target behaviors (aggression, self-injury, dangerous behavior, disruptive behavior, induced vomiting, and inappropriate toileting) decreased. Initially, behaviors did increase during the 4-month baseline period to over 110 instances per day. During Phase 2, behaviors decreased but increased during April, which resulted in less instructional time, location change, and an increase in reinforcement. During

Phase 3, behaviors decreased quickly when treated with negative consequences and later reached zero behaviors and remained zero. This was maintained for 14 consecutive months.

Shawna. Matson et al. (2008) described the treatment of an 11-year-old girl named Shawna with autism. Shawna was referred to this university-based program due to her physical aggression and self-injurious behaviors. It was observed by parents when she was a baby that she never babbled, rarely smiled, and had trouble falling asleep. As Shawna grew older, her communication abilities did not progress from two-word utterances. During the ages of 3 and 5 years old, her speech became echolalic. Shawna had difficulty communicating her emotions and would often isolate herself. Her aggressive behaviors consisted of screaming, hitting, slapping, head butting, pinching, biting, and kicking. She would also hit herself in the head or bang her head against the wall. Many diagnostic assessments and observations were completed with Shawna. Data were collected for 1-week intervals during initial assessments.

A functional assessment was completed to evaluate the functions of Shawna's undesired behaviors. It was determined that Shawna's aggression was maintained by access to tangibles and escape from demands. These behaviors occurred when she tried to do something but was stopped, when there was a change in routine, or given a task demand. The antecedents of self-injurious behaviors were less predictable but appeared to be maintained by attention.

Differential reinforcement of other behaviors (DRO), functional communication training (FCT), and extinction were chosen as effective interventions for Shawna’s physical aggression and self-injurious behaviors. Compliance training was implemented with Shawna to give instruction and processing until compliance was achieved. The goal was to place demands on Shawna, requiring her compliance to gain the ability to tolerate task demands without physical

aggression. Shawna was given verbal or gestural praise for compliance. By the fifth session, Shawna was able to complete work in 5-minute intervals with 90% compliance. Undesired behaviors were easily ignored without further escalation. Generalization skills were taught using other instructors and her father. She was 95% compliant during this time.

Next, FCT was implemented. The goal of FCT was for Shawna to be able to functionally evaluate alternative positive behaviors. Initially, Shawna was trained to hand an “I need help” card when presented with a highly preferred activity that she could not complete independently (Matson et al., 2008). Gestural prompts were required at the start but were able to be faded away quickly. Teaching Shawna how to ask for help was also a goal during FCT. Undesired tasks would be presented to Shawna, where she would again use the “I need help card" (Matson et al., 2008). Generalization skills were taught using other clinicians and her mother. Although mom reported that skills were not consistently being used at home.

Then a DRO schedule was introduced. This would involve reinforcement when undesired behaviors did not occur. The schedule consisted of 10-minute intervals to start but quickly increased to 30-minute intervals with success. Due to less task demand in the home setting, the DRO schedule would occur in 1-hour intervals. Mom reported in the home setting that Shawna was earning reinforcement for 90% of intervals per day.

Limited data was provided from parents in the home setting regarding Shawna’s improvements. When comparing initial data to data after seven treatment sessions, it was determined that Shawna’s physical aggression decreased. Hitting people decreased by 87%, slapping and head butting reduced by 80%, screaming and pinching decreased by 67% and 27% per week.

Alonzo. Falcomata et al. (2013) evaluated functional communication training (FCT) combined with scheduled reinforcement for a 7-year-old boy names Alonzo with autism. This review also contained information about a 12-year-old boy named Joe with Asperger's disorder. Joe was excluded from this review due to his diagnosis of Asperger's disorder which is not related to the participants reviewed in this paper. Alonzo had a history of aggression and disruptive behaviors, defined as hitting, grabbing, throwing objects, pinching, inappropriate vocalization, and destroying academic work. Alonzo had approximately 100 words in his vocabulary but would rarely communicate appropriately to express his wants, needs, or preferred outcomes (Falcomata et al., 2013). This study contained three phases.

Phase 1 involved functional analysis, which contained four out of five conditions. The conditions were escaping, attention, tangible, ignore, and free play. The sessions would be running in 5-minute lengths. During the escape condition, academic tasks were presented using a three-step prompting process which consisted of vocal, gestural, and physical prompts. When challenging behaviors would occur, Alonzo was given a 30-second break from the given task. During the attention condition, Alonzo was given 1 minute of attention before starting the session. Alonzo was shown a nonpreferred activity, and the therapist removed all attention until he engaged in challenging behaviors. When the challenging behaviors occurred, 30 seconds of attention was given. During the tangible condition, Alonzo had access to a highly preferred activity for 1 minute before the session began. When the session started, he was given less preferred activities and was given 30 seconds with a highly preferred activity when challenging behaviors occurred. During the ignore condition, all attention was removed, and no stimuli were

present. During the free play condition, no demands were placed on Alonzo, all attention was given, and all challenging behaviors were ignored.

Results during the functional analysis showed that Alonzo did not engage in any challenging behaviors during the free play condition. Higher levels of challenging behaviors occurred during the escape condition (*M*= 3.7 Responses Per Minute (RPM)), tangible condition (*M*= 1.4 RPM), and during the attention condition (*M*= 0.3 RPM) (Falcomata et al., 2013). With these results, it was determined that challenging behaviors occurred to serve multiple functions.

Phase 2 "(a) implemented FCT to treat multiple functions of challenging behavior by reinforcing mands for a wristband with access to the wristband and access to all functional reinforcers, and (b) incorporated delays to reinforcement following mands for the wristband" (Falcomata et al., 2013, p. 729). Sessions were 5 minutes in length with goals to reinforce mands and delays to reinforcement. During baseline, Alonzo was given 1 minute of attention, access to a highly preferred activity, and provided no demands. When the session began, the highly preferred activity was removed, a direction was given to start academic work, all attention was removed, and gestural prompts were provided. When challenging behaviors occurred, all work was dismissed for 30 seconds, and a highly preferred activity and engagement whereas given for 30 seconds. "Thus, contingent on challenging behavior, all functional reinforcers were provided simultaneously. Mands for functional reinforcers (attention, preferred activities, escape from nonpreferred activities) were ignored" (Falcomata et al., 2013, p. 731).

Several training trials were used before the implementation of the next condition. During training, the mand for the wristband ("wristband please") was taught, which included antecedents (academic work, restricted attention, and restricted access to highly preferred activities) while the

therapist wore the wristband (Falcomata et al., 2013). During this condition, Alonzo received 1minute of attention, access to highly preferred activities, and no demands. During this time, the therapist wore the wristband, and each of the challenging behaviors identified would be programmed in. When the session began, the therapist would say, "I have the wristband. It is time to put down the highly preferred item and work. If you want the wristband, you need to ask for it." (Falcomata et al., 2013, pp. 731-732). Academic work would be presented using gestural prompts as well as the removal of attention. Contingent on Alonzo stating: “wristband please,” the therapist would remove the wristband and place it on Alonzo’s arm, remove academic work, provide attention, as well as access to a highly preferred activity for a 30-second interval. When the 30-second interval was completed, the therapist removed the wristband from Alonzo’s arm, and academic work continued.

The FCT procedure was modified to incorporate delays. “FCT condition described above except that (a) a timer was set for 5 minutes, (b) the therapist wore the wristband throughout the 5-minute interval, and (c) each of the antecedents identified previously as occasioning challenging behavior was programmed to be present for the entire 5-minute interval as described earlier (attention and preferred activities were restricted; work activities such as math and reading were presented)” (Falcomata et al., 2013, p. 732). Gestural prompts were provided if 5 seconds of consistent behavior occurred. The timer was stopped if an additional 5 seconds of behavior occurred. Following the timer, if Alonzo said, “wristband please,” he was given access to the wristband. After gaining the wristband, he was given access to a highly preferred activity for 30-seconds.

During Phase 2 showed that Alonzo's challenging behavior occurred during the combined antecedent baseline (*M*= 1.3 RPM) (Falcomata et al., 2013). He engaged in zero levels of mands for the wristband and functional reinforcers. Before delay thinning, Alonzo engaged in zero levels of challenging behaviors and manding (*M*= 2 RPM) for the wristband (Falcomata et al., 2013). During delay thinning, high levels of challenging behaviors occurred (*M*= 2.6 RPM) along with zero target mands as well as low levels of challenging behavior occurred (*M*= 0.03 RPM) and high levels of target mands (*M*= 0.5 RPM) (Falcomata et al., 2013). Throughout, Alonzo engaged in zero levels of mands for specific functional reinforcers.

Phase 3 contained modified procedures to help Alonzo generalize this procedure in natural environments. During this phase, FCT was involved as well as a chained schedule which consisted of "(a) a FI 5-minute schedule of reinforcement for mands for the wristband and (b) a concurrent FR 1/FR 1/FR 1 schedule of reinforcement for mands for specific functional reinforcers" (Falcomata et al., 2013, p. 735). Sessions were 5 minutes in length. Before beginning, the therapist provided Alonzo with 1 minute of attention and access to a highly preferred activity with no demands. When the session began, the therapist wore the wristband, and the chained schedule was in place ("therapist + wristband = FI 5-minute schedule; participant + wristband = FR 1/FR 1/FR 1 concurrent schedule") (Falcomata et al., 2013, p. 736). When the timer was finished, Alonzo gained access to the wristband, and mands for specific functions reinforcers were enforced such as, "I want a break, I want you to play with me, I want computer" (Falcomata et al., 2013). This occurred on a concurrent FR 1 schedule with access to a highly preferred activity for 30-seconds.

Results of Phase 3 showed the combination of FCT and chained scheduled resulted in a decrease in challenging behaviors from (*M*= 1.2 RPM) and zero levels of mands for the wristband to (*M*= 0.6 RPM) and a higher level of mands for a wristband (*M*= 0.3 RPM) (Falcomata et al., 2013). Alonzo consistently manded for escape (*M*= 0.2 RPM) and access to highly preferred activities (*M*= 0.2 RPM) during component (b) of the chained schedule (Falcomata et al., 2013).

Troy. Carnett et al. (2014) compared token economy system interventions that did not include interest-based reinforcement 7-year-old boy named Troy with autism. Troy lived at home with his father, mother, and three older siblings. According to the Childhood Autism Rating Scale (CARS), Troy scored a 31, which indicated mild-moderate autism. On the Behavior Assessment System for Children-II (BASC-II), he scored a 99, which falls under the significant range. Troy attended public school and spent most of his day in a special education life skills classroom with four to eight other students. According to Troy's IEP, he spent 1 hour of his school day with non-disabled peers. But because of Troy's behaviors (screaming, falling, and/or laying on the ground), this was impossible. This did occur during nonacademic times with less task demand because it was determined that the function of his behavior was maintained by escape.

Intervention sessions took place in both his life skills classroom and inclusion classroom. The inclusion classroom consisted of one teacher, 14 students without disabilities, two with learning disabilities, and two with developmental disabilities. Both classrooms had an early literacy activity that lasted from 10-12 minutes three to four times per week. During this time, the students were expected to sit quietly, look at the teacher, listen, and answer comprehension

questions about the book being read. Data were collected for Troy's challenging behaviors, which were defined as screaming, falling, and/or laying on the floor. Data were also collected during Troy's on-task behaviors. During baseline collection, four out of the five sessions were in the life skills classroom due to higher rates of challenging behavior. Before starting each session, teachers reminded students what on-task behaviors looked like and provided praise when on-task behaviors occurred. When challenging behaviors occurred, the behavior was either ignored or given a mild redirection, but it was never consistent, so the challenging behaviors occurred for over 6 months.

Token Economy without Interest-Based Reinforcement

This token economy intervention did not include any of Troy's selected high-interest items. It was presented with pennies contingent on 20 seconds of consistent on-task behaviors. A maximum of 30 tokens could be rewarded during the 10-minute interval. Backup reinforcers could be earned for every 10 tokens.

Token Economy with Interest-Based Reinforcement

This token economy intervention was different in that instead of earning pennies; he would earn puzzle pieces which were a high-interest item of Troy's. It was the same in the way that tokens would be earned contingent on 20 seconds of consistent on-task behaviors. A maximum of 30 tokens could be rewarded during the 10-minute interval. The same procedures, response requirements, exchange rate, and backup reinforcers took place.

During baseline, Troy experienced challenging behaviors in the life skills classroom for a mean of 89% of intervals (range from 82-92%) and the inclusion classroom for a mean of 87% of intervals. Both token economy interventions decreased challenging behavior. It was a more

significant decrease when a high-interest reinforcement was used with a mean of 40% of intervals (range from 30-52%). Compared to the use of no high-interest reinforcement with a mean of 55% of intervals (range from 45-68%). During the best-treatment phase in the inclusion classroom, challenging behaviors occurred with a mean of 36% (range from 28-48%). During baseline, Troy was on task in the life skills classroom for a mean of 11% of intervals (range from 8-18%). In the inclusion classroom, he was on task for a mean of 13% of intervals. Both token economy interventions improved Troy's on-task behavior during the alternating intervention phase. With high-interest reinforcements, on-task behaviors occurred for a mean of 59.7% of intervals (range from 48-70%). Without high-interest reinforcement, on-task behaviors occurred for a mean of 45% of intervals (range from 32-55%). In the inclusion classroom and during the best-treatment phase, on-task behaviors occurred for a mean of 64% of intervals (range from 52-72%).

Henry, Jessica, and Courtney. Anderson et al. (2016) examined the effects of literacy-based behavioral interventions (LBBI) to decrease physical aggression. This study took place with three participants Henry, Jessica, and Courtney. Individuals with autism may display physical aggression to communicate their wants or needs as they have difficulty with social functioning and communication. Some individuals may be verbal, while some are nonverbal. For this reason, individuals with autism tend to be visual learners, thus making verbal direction ineffective. Social stories are short and written to describe a specific situation that may be new or challenging. “This information often includes (but is not limited to) where and when a situation takes place, who is involved, what is occurring, and why it is occurring” (Anderson et al., 2016, p. 92). Sentences in a social story should be descriptive, perspective, affirmative, and directive.

There has been little research that has examined the effectiveness of stories that do not follow specific guidelines.

"Similar to social stories are literacy-based behavioral interventions (LBBI) in that they are individually written stories designed to teach new skills (Anderson et al., 2016, p. 93). This study focuses on kindergarten and first-grade students with autism and/or significant developmental delays.

The three participants Henry, Jessica, and Courtney were enrolled in a rural elementary school with 714 students. Twelve percent of the school's population was special education, and 47% received free or reduced lunches. The three chosen had difficulty expressing their wants and needs, which exhibited physical aggression toward themselves or others.

Henry was a 5-year-old male in kindergarten who had a primary diagnosis of significant developmental delay and a secondary diagnosis of autism. Henry was verbal but had limited abilities to be able to express his wants and needs. Henry was unable to seek attention appropriately from both adults and peers. His aggression was in the form of hitting, kicking, screaming, biting, and running away.

Jessica was a 6-year-old female in kindergarten who had a primary diagnosis of autism. Jessica was on grade level in academics, but she would become physically aggressive when she was presented with a writing task. Her aggression was in the form of screaming, kicking, throwing desks and chairs, biting both adults and peers.

Courtney was a 5-year-old male in kindergarten who was verbal but often had difficulty expressing his wants and needs or would get frustrated in social situations. He had a primary diagnosis of significant developmental delay and a secondary diagnosis of autism. Courtney was

very low academically and would get easily frustrated when presented with a task resulting in physical aggression.

Each intervention consisted of an individual personalized LBBI explicitly written for each student, which was presented three times daily and narrated by an adult that each student knew. Each contained photos, periods when behaviors occurred, and strategies to use instead of undesired behaviors. “The first presentation for all students occurred during homeroom (7:15-7:45 am). The second presentation occurred right before the targeted period, lunch or writing for each participant. For example, with photographs of the lunchroom, Henry’s story taught him that if he wanted or needed a break from the stimulation of the lunchroom, he needed to say ‘break,’ and a break would be given. He was taught that he would have to return to the lunchroom; however, he could take as many breaks as needed during the 30-minute lunch period. Therefore, before going to lunch, Henry listened to and viewed his story reminding him of the desired behavior choices. The third presentation of the story for the three participants occurred at the end of the day before the students leaving school” (Anderson et al., 2016, p. 96). After pre-teaching during the first week of intervention, Henry, Jessica, and Courtney could independently access their narrated story when directed.

Baseline data were collected during specified 30-minute intervals using frequency recording sheets. Data were collected from 1050 to 11:20 (lunch) for Henry. During that time, he exhibited 5 to 15 episodes of physical aggression with a consistent increase. Henry would be physically aggressive with not only staff but peers as well. He learned that if he became aggressive, he would be removed, which is what he wanted due to the lunchroom being a very noisy and stimulating area. Data were collected at 1:30 to 2:00 (writing) for Jessica and 10:00 to

10:30 (writing) for Courtney. These times were found to be the highest rates of physical aggression for both students. It was determined that both students were using avoidance techniques to escape the undesired writing task. Jessica exhibited an average of nine episodes of physical aggression during one 30-minute interval, and the day before the intervention began, she displayed 17 episodes of physical aggression. Courtney exhibited an average of 12 episodes of physical aggression, and the day before the intervention started, he exhibited 21 episodes during one 30-minute interval.

During the first week of interventions, Henry's physically aggressive episodes decreased significantly to an average of one per 30-minute interval. During the first day of interventions, Jessica exhibited three episodes of physical aggression, averaged five episodes during the first week, and 2.6 episodes during the second week. Courtney showed an immediate decrease in physical aggression once interventions began. During the first day, he exhibited four episodes of physical aggression and two episodes per day during the first week. All three students had a reduction in behavior when compared to their baseline data. Henry's number of episodes went from 10 during baseline to .4 during and after the intervention. Jessica's number of episodes went from 9.8 during baseline to 3 during and after the intervention. Courtney's number of episodes went from 12.5 during baseline to 1.1 during and after the intervention. Overall, Henry and Courtney were able to generalize their skills across different settings and situations, gaining new skills to independently recognize when their feelings would change and how to work through those situations. Jessica's episodes of physical aggression decreased by the end of the intervention, but she was still working on generalizing those skills.

Ethan. Cariveau et al. (2019) completed a study on an 8-year-old boy with autism named Ethan. Ethan had recently been admitted to a day-treatment program for his aggressive behaviors. Ethan's aggressive behaviors were in the form of hitting, kicking, biting, scratching, and throwing objects. Ethan was a verbal child who communicated through the use of several word statements. Ethan would often become aggressive with his younger brother when he would attempt to play with Ethan.

During baseline, interruptions by a therapist took place during sessions. Sessions were done place in a padded room with one-way mirrors and audio-visual equipment. Interruptions included manipulating materials that Ethan preferred at that time. "For example, if Ethan was building with Legos, an interruption would be scored if the therapist added or removed pieces from the structure. Similarly, if Ethan was using the iPad, an interruption would be scored if the therapist selected something on the screen" (Cariveau et al., 2019, p. 204). These interruptions caused an increase in aggression. A second independent observer collected data during 31.43% (functional analysis) and 33.33% (treatment) sessions. The exact agreement between observers was calculated by taking the total number of 10-s intervals with the agreement, divided by the total number of intervals, and multiplied by 100. Average agreement coefficients were 97.95% (functional analysis) and 97.45% (treatment)" (Cariveau et al., 2019, p. 204).

Interventions were put into place that involved differential reinforcement of other behaviors (DRO) and response cost. Ethan was provided with uninterrupted access to highly preferred items for intervals, followed by the therapist interrupting Ethan's play for intervals. Colored cards were placed on the wall at eye level to signal each component of the schedule. Green cards represented 60 seconds of uninterrupted play with no demands. The therapist would

state, “it is time for things to go your way” (Cariveau et al., 2019). If problem behaviors occurred, the green card would be removed, and a red card would be presented. The therapist would now state, “It is time for things to go my way” (Cariveau et al., 2019). During this time, the play was continuously interrupted. If aggression occurred during this interval, the timer was reset, and the therapist would state, “because you hurt me, we are staying on red longer” (Cariveau et al., 2019). Once this interval was completed without any problem behaviors, the green card would replace the red card. Once low rates of aggression occurred at 5-second intervals, scheduled thinning took place. This involved increasing intervals to 50% following two consecutive sessions with no problem behaviors. This took place until intervals reached 10 minutes.

Initially, during baseline, aggression occurred at increasing rates. After introducing interventions and multiple schedules initially, aggression increased but continued to decrease throughout the study. Aggression mainly increased during sessions, with interruptions showing little to no increase during sessions without interruptions. It was “hypothesized that this increase was due to attempts to access therapist attention. Thus, prompting reinforcement of a mand for attention was introduced at session 119, and few to no instances of aggressions were observed for the remainder of this phase” (Cariveau et al., 2019, p. 206). By session, 140 sessions were thinned to 10 minutes. “This study demonstrates that delivering the functional reinforcer, access to uninterrupted repetitive behavior, as the sole reinforcer for tolerating interruptions and the inclusion of a response cost contingency may be a sufficient treatment” (Cariveau et al., 2019, p. 206). Behavior must be reinforced consistently for this to be successful.

Chapter 3: Conclusions and Recommendations

The focus of this paper was to determine what behavioral interventions provide the most effective ways to reduce aggressive behaviors in students with Autism Spectrum Disorder. I chose this topic because of my current teaching position in a Federal Setting Level IV program at Rum River South, a part of the Rum River Special Education Cooperative. This setting consists of students with autism who have been unsuccessful in a mainstream setting. Students have been unsuccessful due to physical aggression, property destruction, continuous disruption, and self-injurious behaviors. Working in this setting can result in potential harm to staff or other students. I have experienced injury and witnessed injury but have also implemented and experienced interventions to guide these students in the right direction to be successful across all environments. It is our responsibility as staff members to make sure that safe and effective interventions are in place to ensure all.

Conclusions

After reviewing eight studies discussed in Chapter 2, it was determined that the following behavioral interventions showed a significant decrease in problematic behaviors by the end of all sessions.

Differential Reinforcement of Other Behaviors (DRO)

"Differential reinforcement of other behaviors (DRO) is a behavioral, reinforcement-based procedure that consists of the delivery of a consequence contingent on the absence of challenging behavior, leading to a reduction of the future occurrence of the targeted challenging behavior" (Weston et al., 2018, p. 585). Two reviewed studies on Johnny and Ethan determined

that not only did DRO interventions decrease challenging behaviors, but it also increased academic performance.

Extinction

A way of fading away and eventually eliminating undesired behaviors by withholding positive reinforcements. An example of this would be if a student becomes aggressive to gain a tangible item, ignore the aggressive behavior, and not give the desired item. While you are teaching replacement strategies to gain the tangible item appropriately. Behaviors may increase before they decrease, and this is referred to as an extinction burst (Autism Speaks, 2012, p. 48)

Functional Communication Training (FCT)

Evidence-based practice positively impacts the communication skills and behaviors of children with autism (Mancil et al., 2006, p. 616). Developed in the mid-1980s FCT determines the function of behaviors by using a functional behavior assessment to replace undesired behaviors. Students can be taught replacement behaviors involving verbal language, picture communication, gestures, or assistive technology devices. Two reviewed studies of Richard and Alonzo determined that FCT is an effective intervention to shape and decrease undesired behaviors.

Literacy-Based Behavioral Interventions (LBBI)

Individual written stories to teach new replacement skills (Anderson et al., 2016). Individuals with autism often misinterpret the meaning of a conversation or miss the nonverbal cues presented. For this reason, individuals with autism tend to be visual learners, thus making verbal direction ineffective and making LBBI an effective intervention. A reviewed study of LBBI determined that Henry, Jessica, and Courtney had a reduction in behavior after sessions

compared to baseline data. All participants could generalize their skills across different settings and situations, gaining new skills to independently recognize when their feelings would change and how to work through those situations.

Reinforcement

"Reinforcement involves providing desirable consequences following a behavior to increase the likelihood that the behavior will occur again. There are several types of reinforcement strategies" (Fitzpatrick et al., 2016, p. 1527). Differential reinforcement is based on the number of times the target behaviors occur, or the appropriate behavior occurs. It is crucial to be reinforcing if the behavior is absent or when an appropriate behavior occurs and serves as the same function. Noncontingent reinforcement is based on the occurrence of a behavior. It should potentially be paired with the use of a fixed schedule and or extinction strategies for studies were reviewed on Richard, Ned, Alonzo, and Troy during this paper. It was determined that forms of reinforcement had been proven effective in decreasing challenging behaviors in students with autism.

Token Economy System

"Token economy interventions involve delivering small tangibles contingent on the presence or absence of target behaviors, then providing an opportunity to exchange a present number of tokens for backup reinforcers" (Carnett et al., 2014, p. 369) A reviewed study on Troy looked at the effectiveness on token economy systems with and without interest-based reinforcement. It was determined that both forms of token economy systems decreased undesired behaviors, but a more significant decrease occurred when an interest-based reinforcement system was present.

Recommendations for Future Research

It was determined by Falcomata et al. (2013) that future studies should evaluate functional behavioral assessments (FBA) and what procedures may be necessary when treating behaviors that serve multiple functions. It was also determined that participants with more limited communication skills, such as nonverbal participants, should be evaluated as procedures may need to be adjusted. "For example, discriminative training would likely be required to produce positive outcomes if nonverbal communicative modalities were to be targeted using similar procedures as the current ones to simultaneously treat multiply maintained challenging behavior" (Falcomata et al., 2013, p. 743). Further research should evaluate the use of fading procedures when token economy systems are embedded, or other interventions are in place. Many of the studies reviewed did not discuss the topic of generalization. Individuals with autism need to generalize their skills across multiple different settings and keep all undesired behaviors near or at zero levels.

Implication for Practice

In my current position at a federal setting level IV program, many of the reviewed interventions have been used throughout my teaching. Interventions should be student-specific and geared toward the function of behavior to be effective. Using these strategies combined with Positive Behavioral Interventions and Supports (PBIS) regardless of what tier the student falls under has also been proven effective through research. Clarity, consistency, and continuation will also guide the student in the correct direction for success and generalization. The use of positive structures, visual supports, choices, validation, coregulation, and break systems (sensory breaks) can help students be more successful in the classroom.

Students with autism communicate through the use of undesired behaviors. They cannot effectively communicate their wants and needs, which results in hitting, kicking, biting, etc. By identifying the function of the behavior through the use of an FBA, we can more effectively provide students with the correct interventions to help them be successful.

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