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**Strategies to Decrease Physical Aggression in Elementary Students with Autism Spectrum
Disorder**

By

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Chapter 1: Introduction

Over the last three decades a growing number of individuals have been diagnosed with autism spectrum disorder (ASD). In 1995 rough estimates suggested that one in 500 children were likely to be diagnosed with autism spectrum disorder (autismcenter.org). In 2021, the Center for Disease Control reported that approximately one in 44 children in the United States was diagnosed with ASD (Autism Speaks, 2022). Some students with autism spectrum disorder may exhibit behaviors that are problematic and difficult for teachers and caregivers to manage. These behaviors make it crucial for teachers to be equipped with interventions that are effective and easy to implement within the school environment.

In a study conducted on the prevalence of aggression among children between the ages of four and 17, researchers found that 56 percent of respondents, from a sample of 1380 children, were currently engaging in some physically aggressive actions ranging from mild to severe, towards caregivers and non-caregivers (Kane & Mazurek, 2010). However, there is limited research on the prevalence of aggression in individuals with ASD. This may be because aggression can range from mild to severe with no consistent definition of aggression among researchers and studies. Physical aggression in individuals with autism spectrum disorder may look like eloping (leaving designated area), hitting, kicking, refusal, spitting, hair pulling, or pinching. Some individuals may exhibit verbal aggression that looks like yelling, crying, moaning, humming, swearing, and screaming (Fitzpatrick et al., 2016). Self-injurious behavior may look like head banging, biting self, pinching self, hitting, or punching self, and pulling hair (ncbi.nlm.nih.gov). Individuals with autism spectrum disorder demonstrate their own unique aggressive behaviors. It is important that educators and caregivers find best practices and research-based interventions to keep themselves and the individuals with ASD safe.

Research Question

One research question guides this review of literature:

What intervention strategies have been found to be effective for elementary students with autism spectrum disorder to decrease physically aggressive and self-injurious behaviors?

Historical Perspective

Autism spectrum disorder (ASD) has been present for centuries, however, efforts to educate individuals with disabilities has been a relatively recent phenomenon. Historically, the term autism was used to describe some schizophrenic symptomatology (Zaky, 2017). In the 1940's, Dr. Leo Kanner used the term to refer to children suffering from social and or emotional problems. While Dr. Kanner was examining his patients, treatment was very limited. (Zaky, 2017). Most of these children were placed in institutions far from the public eye, and parents were often blamed for their children's disorders (National Autism Center, n.d). It wasn't until the 1960's that autism was identified as a separate disorder from schizophrenia (Zaky, 2017). In 2013, the Diagnostic and Statistical Manual of Mental Disorders; 5th edition (DSM-5) was published. Prior to the publication of the DSM-5 there were different types of autism spectrum disorders that included Asperger disorder (Zaky, 2017). According to the DSM-5, behaviors associated with autism spectrum disorder manifest on a spectrum of severity ranging from mild to severe. An example to highlight the difference in diagnosis from the past to the present are individuals who were previously diagnosed with Asperger disorder, are now diagnosed as autism spectrum disorder (ASD) without impairment of language or intellect (Zaky, 2017).

Focus of the Review

The review of literature in Chapter II contains studies on research-based interventions. Interventions include therapeutic strategies, such as, functional behavior assessment, functional

communication training, video modeling, literacy based behavioral interventions, and establishing routines and expectations. The focus of this paper is to identify interventions that have a positive impact on elementary students with autism spectrum disorder who have demonstrated physically aggressive behaviors and self-injurious behaviors. It is important to note that, while the focus of this paper is individuals with ASD, there is significant overlap in the research between autism spectrum disorder (ASD) and intellectual disabilities (ID).

I began examining research literature on interventions for students with autism spectrum disorder that demonstrate aggressive behaviors to enhance my understanding and background knowledge of the topic. I narrowed my focus to elementary students because I work with students in kindergarten through fifth grade. I have also expanded my research to include interventions that can be used outside of the educational field, because as I was researching the topic it became evident that individuals demonstrate these behaviors outside of school as well as in school. Some keywords and combinations of keywords that I used to search for studies using Academic Search Premier, Google Scholar, and APA PsycINFO included: *autism spectrum disorder, physical aggression, verbal aggression, self-injurious behaviors, interventions, best practices, educators, caregivers, and elementary students.*

Importance of the Topic

Aggression in children with autism spectrum disorder (ASD) and intellectual disabilities has been found to be significantly associated with burnout and emotional exhaustion among teachers and support staff (Kane & Mazurek, 2010). As a special education teacher that works with students that have intellectual disabilities and ASD, I see these aggressive and self-injurious behaviors in students. Most of the students I work with demonstrate aggressive or self-injurious behaviors daily. Each year the number of students that I work with who exhibit physical

aggression or self-injurious behaviors seems to increase. My colleagues and I have endured physical assaults that have left us in tears and required medical attention. This aggression is not specific to the educational setting. Behaviors that individuals with autism spectrum disorder exhibit in home are often the reason families seek out of home placements in residential treatment facilities (Kane & Mazurek, 2010). Quality of life for individuals with autism spectrum disorder, their caregivers, and educators depends on finding best practices and interventions for decreasing aggressive behaviors in students demonstrating these behaviors.

Definition of Terms

Aggression: Characterized as behavior that is threatening or likely to cause harm and may be verbal (e.g., threatening or cursing) or physical (e.g., hitting, biting, or throwing objects) (Fitzpatrick et al., 2016).

Autism Spectrum Disorder (ASD): autism spectrum disorder is a neurodevelopmental disorder that affects how an individual processes information and interprets the world. Core features of autism are persistent deficits in social interaction and communication; and restricted, repetitive, or stereotyped patterns of behavior, interests, or activities. Individuals with ASD display a unique combination of characteristics, ranging from mild to severe, requiring individually determined educational and treatment programming (Retrieved from Minnesota Department of Education, 2022).

Functional Analyses (FA): FA uses analogue conditions in which antecedent or consequent variables are systematically manipulated within an experimental design. (Delfs & Campbell, 2010).

Functional behavior assessment (FBA): A functional behavior assessment (FBA) is utilized when a challenging behavior regularly interferes with the child's safety, the safety of others,

and/or the learning process. A functional behavior assessment can be used to help a learner's team develop a hypothesis concerning the reason for the behavior and select effective behavioral supports to address the interfering behavior (Retrieved from Autism Focused Intervention Resources & Modules, 2015).

Functional Communication Training (FCT): FCT is a differential reinforcement procedure in which an individual is taught an alternative response that results in the same class of reinforcement identified as maintaining problem behavior. The alternative response is a recognizable form of communication (e.g., a vocalization, manual sign). (Tiger et al., 2008).

Literacy-Based Behavioral Interventions (LBBI): A Literacy-Based Behavioral Intervention is a short story that describes a situation, skill, or concept to help improve the understanding of the person involved. This type of intervention can be used to help with a distressing situation, teach a skill, describe a routine, introduce something new, or change a behavior. Formats include Social Stories, Comic Strip Stories, PowerPoint stories, or handwritten stories with photographs. (Retrieved from Florida Atlantic University, 2020)

Self-injurious behavior (SIB): the occurrence of behavior that could result in physical injury to one's own body. Common forms of SIB include, head-hitting, head-banging, and self-biting (Retrieved from [PubMed](#) National Library of Medicine, 2022).

Sensory Integration Therapy (SIT): Sensory integration therapy was developed in the 1970's and is designed to help children with sensory-processing problems cope with the difficulties they have processing sensory input. Therapy is play-oriented and may include using equipment such as swings, trampolines, and slides. Sensory integration also uses therapies such as deep pressure, brushing, and weighted vests. (Retrieved from [Healthy Children.org](#), 2019).

Social Story: A social story is a short, simple story that provides information about a social situation and the appropriate behaviors needed for that situation. The defining feature of a Social Story is a ratio of two to five descriptive, affirmative, or perspective sentences for every directive sentence. (Anderson et al., 2016).

Video Modeling: An effective intervention used to teach target skills to students with autism. This intervention involves videotaping a target skill, which is modelled by self, peer, or adult in an environment similar to the environment in which the target skill is required (Cihak et al., 2010).

Chapter 2: Literature Review

The purpose of this review of literature is to examine scientifically based research on effective interventions for teaching students with autism spectrum disorder (ASD) that engage in self-injurious behavior and/or physically aggressive behaviors that interfere with learning. This review of literature explored interventions that Individual Education Planning (IEP) teams and caregivers can use to create a learning environment that ensures methodical progress toward teaching social and communication skills while decreasing behaviors. This chapter is organized around three effective themes of evidence-based practices: *functional behavior assessment*, *social skills training*, and *behavioral approaches*.

Functional Behavior Assessment

Challenging behaviors exist because of reasons unknown to those encountering a child with autism spectrum disorder (ASD) in distress (Theisen, 2016). Educators and caregivers are often faced with challenging behaviors of students with ASD. The challenging behaviors include physical aggression towards self and others. Collecting data to find the function of behavior is the first step to a solution. Von der Embse et al. (2011) reviewed seven empirical studies and completed a qualitative study based on the information they found. The purpose of their study was to identify best practices in reducing problem behavior and promoting inclusion for students with autism spectrum disorder. The push toward inclusion for students with ASD makes it important to understand the barriers that may impede this process and work toward viable solutions for educators. They identified four effective themes: functional behavior assessments, tiered models of service delivery, behavioral approaches, and social skills training (Von der Embse et al, 2011). The researchers used a multistep selection process to select studies published in English in peer-reviewed journals from 2000-2010. To be included, the studies had to meet the

following criteria: the article had to be empirical, it had to include at least one school-age participant with ASD, it had to have contained an intervention with the purpose of facilitating inclusion, and the intervention had to have had at least one school-based component. According to Von der Embse et al. (2011) Functional Behavior Assessment (FBA) is a method that identifies *why* a behavior occurs within a complex array of interacting variables by identifying the antecedent, the target behavior, and the consequence of the target behavior. Although not considered an intervention per se, FBA is an important first step to gathering valuable information in systematically identifying the problem behavior. Once the function is discovered, the treatment can begin to decrease the challenging behaviors. This review was limited because much of the research reviewed in their article did not systematically measure or evaluate inclusion, they often relied on subjective teacher report or hinted at the social aspects of inclusion without explicitly measuring anything (Von der Embse et al., 2011).

In some cases, a functional behavior assessment (FBA) is mandated by federal law (Theisen, 2016). The FBAs that are conducted in school settings typically include both indirect measures—such as interview, rating scales, and archival reviews—and direct observations through descriptive summaries of behavioral patterns (Lewis et al., 2015). Lewis et al. (2015) conducted a descriptive study to evaluate the degree to which hypotheses generated by FBA strategies (i.e., interview, rating scales, and direct observation) match hypotheses generated through Functional Analysis (FA) trials. Functional Analysis typically involves the direct manipulation of antecedent and consequent variables paired with the direct measurement of student behavior (Lewis et al., 2015). Functional Analysis is less feasible in educational settings due to the lack of personnel with expertise to design and implement trials, the time involved in conducting multiple trial configurations, and the need for sophisticated direct observation data collection across trials.

Participants in their study included six students with mild disabilities who demonstrated low intensity, high frequency behaviors. All the participants spent the majority of their school day in pull-out special education classrooms. Participants were included in the study based on teacher referral and preliminary observations in the classroom confirming high rates of problem behavior. The study was conducted through four phases. Phase One consisted of teacher student nominations and direct observations to confirm the presence of low-intensity, high-frequency disruptive problem behavior. Phase Two was the completion of an FBA, which included a rating scale, a guided teacher interview, and direct observations within settings noted as problematic. In Phase Three, direct manipulations of four structural variables occurred through brief Functional Analysis (FA). In Phase Four, independent hypotheses were developed for the FA trials based on visual analysis of the graphed data (Lewis et al., 2015).

Lewis et al.(2015) used simple checklists to ensure each of the steps of the FBA measures were completed accurately, and this resulted in 100% compliance fidelity. The researchers found across summary functional behavioral assessment (FBA) and functional analysis (FA) trials, there was 100% agreement across three of the participants on both primary and secondary hypotheses. For the remaining three participants, the FBA hypothesis did align with the secondary FA hypotheses. Unlike past research that showed inconsistencies across Functional Behavioral Assessment measures and Functional Analysis outcomes, the study by Lewis et al., demonstrated that FBA specialists generally generated similar hypotheses across rating scales, interview, and direct observation. It was not surprising that the FA trials identified that the primary function of problem behavior for all participants was to escape or avoid difficult tasks. Limitations of their study included the small number of students combined with the descriptive nature of the study (Lewis et al., 2015).

Conducting a Functional Behavior Assessment (FBA) or a Functional Analysis (FA) depends on the evaluators' training and commitment to the fidelity of the measure. Camacho et al. (2014) conducted a quantitative study to measure various FBA conditional assessment tools with the same child. In Phase One, the descriptive assessment measures were identified. In Phase Two, modified functional analysis implemented. In the final phase, an intervention based on the findings was implemented. The participant was a six-year-old male with a diagnosis of autism spectrum disorder (ASD). He attended a special education school and his class consisted of five students. One of the students was directly affected by his behaviors because of physical contact and aggression towards her. Camacho et al. (2014) used the Functional Assessment Interview for the descriptive assessment and data collected for the direct FBA were analyzed using an Antecedent, Behavior, Consequence observation worksheet. A multi-element design was used for the Functional Analysis.

The results from Phase One indicated that the primary function of behavior was gaining the peer's attention. Results from Phase Two suggested that the participant's behaviors served either as an escape from under-stimulation or that they were maintained by automatic reinforcement. In Phase Three an intervention was designed to teach the participant how to engage in an activity he enjoyed. During the FA, it was confirmed that he enjoyed sitting on and pushing the tricycle, so the intervention consisted of teaching him how to use the tricycle. The results of this study indicate that Functional Behavior Assessments can be successfully conducted in the school setting and provide valuable information for the development of an effective intervention. The participant was able to increase positive behaviors due to understanding the function of the behaviors. Limitations of this study included small sample size, and time limitations preventing

the researchers from obtaining follow-up data to assess maintenance of the replacement behavior and generalizations to other settings (Camacho et al., 2014).

Table 1

Summary of Related Literature: Functional Behavior Assessment

AUTHOR (YEAR)	STUDY DESIGN	PARTICIPANTS SETTING	PROCEDURES/ INTERVENTION	FINDINGS
Von der Embse et al. (2011)	Quantitative	7 empirical articles containing intervention with purpose of facilitating inclusion for school age participants with ASD Educational Setting	Functional Behavior Assessments Tiered Models of Service Delivery Behavioral Approaches Social Skills Training	Found that four themes demonstrated to be effective in reducing problem behavior and promoting inclusion
Lewis et al. (2015)	Quantitative	6 students with mild disabilities, including autism, who demonstrated low-intensity, high frequency problem behaviors, age 9-15 Educational setting	Functional Behavioral Assessment & Functional Analysis	Results demonstrated 100% agreement across 3 participants, and generally similar hypotheses with the other participants.
Camacho, Anderson, Moore, & Furlonger (2014)	Quantitative	1 six-year-old male diagnosed with ASD, educational setting	FBA, FA, ABC Analysis	Participant was able to increase positive behaviors due to understanding the function of the behaviors.

Social Skills Training

Students with autism spectrum disorder (ASD) demonstrate persistent deficits in social interactions and need the familiarity of routines (Theisen, 2016). Data from a Functional Behavior Assessment can inform social skill intervention selection. Video modeling and Social Stories are strategies that can be implemented to teach positive social behaviors and have been shown to increase positive social interactions which can lead to decreased physical and self-injurious behaviors.

Cihak et al., (2010) conducted a quantitative study to evaluate the efficacy of video modeling to assist elementary-age students with transitioning between locations and activities within the school. Children with ASD often demonstrate difficulties with environmental change that often manifests in severe behavior problems during times of transition (Cihak et al., 2010). An important goal of educators and caregivers is to identify and implement the use of positive behavioral supports to increase successful environmental transitions and reduce problem behaviors associated with transitional situations. In their study, Cihak et al.(2010) specifically examined video self-modeling, in which the target student serves as the model and views themselves performing the target behaviors accurately and independently. Four elementary students diagnosed with autism spectrum disorder participated in this study, the ages ranged from 6-8 years old. Each participant was selected based on the following criteria, an Individualized Education Program (IEP) objective related to improving adaptive social behavior skills, difficulty with transitions, no hearing or vision impairments that might impede video instruction, agreeing to participate in the study, and parental permission. Each participating student attended a different elementary school. All students communicated primarily using gestures, pictures, and single word signing. Behaviors demonstrated during transitions included physical aggression,

elopement, and refusal. Ten videos for each student were developed showing a positive self-model of the appropriate alternative behavior which was the student transitioning independently from place to place (Cihak et al., 2010).

The study included five phases. Phase One was baseline. Phase Two the handheld video-modeling procedures were implemented. Phase Three no handheld video-modeling procedures. Phase Four, the handheld video-modeling procedures reinstated, and Phase Five was the maintenance phase (Cihak et al., 2010). When students used video modeling during intervention, ascending trends were observed. When the video-modeling intervention was withdrawn, descending trends were observed. However, the mean percentage of independent transitions and ascending trends were observed when the handheld video-modeling intervention was reimplemented. Students maintained a mean level of 98% independent transitions nine weeks later (Cihak et al., 2010). A small sample size is one of the limitations of this study. Another limitation of this study was the fact that a functional behavior assessment or analysis was not conducted prior to intervention implementation, so the function of the students' behavior was not determined (Cihak et al., 2010).

In their systematic literature review, Martinez, Werch, and Conroy (2016) found that interventions implemented in school settings can effectively decrease challenging behaviors exhibited by young children with autism spectrum disorder (ASD). They examined 26 studies that included 44 children ages three to eight years old with ASD. Studies were included if the participants were within the specified age range, had a diagnosis of autism spectrum disorder, implemented an intervention focused on decreasing the challenging behaviors exhibited by the participants, employed a single-case research design to examine the effects of the intervention on the participants' target behaviors, and occurred between 2000-2015 (Martinez et al., 2016).

Interventions were categorized using the following categories: antecedent-based interventions, function-based interventions, reinforcement interventions, instructional interventions, and multicomponent interventions. The studies reviewed function-based interventions targeted destructive behaviors and implemented functional communication training (Martinez et al., 2016). Social stories were the instructional intervention most frequently implemented in the reviewed studies. Antecedent-based interventions consisted of providing participants with unrestricted access to items that maintained their challenging behaviors prior to activities in which they exhibited high rates of challenging behaviors, embedding preferred materials into activities in which participants exhibited high rates of challenging behaviors, or providing participants with visual cues to indicate to them times in which it was acceptable and times in which it was not acceptable for them to engage in challenging behaviors. Reinforcement interventions involved the delivery of preferred tangibles or edibles to the participants for engaging in socially appropriate behaviors as a means to reduce their challenging behaviors (Martinez et al., 2016).

An encouraging finding was that all the reviewed interventions were effective in decreasing the challenging behaviors exhibited by the participants. Limitations of their literature review include publication bias. Publication bias occurs when researchers do not submit for publication studies with negative findings (Martinez et al., 2016). In addition, this review included a small number of studies, so there may be insufficient data to draw firm conclusions about the effectiveness of the reviewed interventions on the challenging behaviors exhibited by the participants (Martinez et al., 2016).

Social Stories are often used with children with autism spectrum disorder (ASD) to provide information about appropriate behaviors in specific contexts. The literature review conducted by

Martienz et al.(2016) found that social stories were the instructional intervention most frequently implemented in their reviewed studies. Pane et al., (2015) used a brief functional analysis to assist in developing a Social Story that matched the function of the target behavior for two boys with autism spectrum disorder (ages 10 and 15). The participants were selected based on having a diagnosis of autism spectrum disorder, demonstrating problem behavior as reported by school staff, and attending a public school. Parental consent was obtained. For both boys, the functional analysis indicated that the target behavior was maintained by negative reinforcement. Sessions were conducted in the participants' homes and a treatment extension was conducted in the public school they attended. The target behaviors for this study were facial grimacing and non-contextual smiling/laughter.

This study examined the differential effects of a social story that matched the function of the behavior and a social story that did not match the function of the behavior. The target response for the social story that matched the function of the behavior was defined as the participant requesting a break. The target response for the social story that did not match the function of the behavior was defined as the participant asking, "Can you check my work?" The function-based social story combined with Functional Communication Training (FCT) was effective in decreasing the target behavior and in teaching the participants to use the target replacement behavior. Limitations of the study conducted by Pane et al. include a small sample size and using only one function of behavior (Pane et al., 2015).

Table 2*Summary of Related Literature: Social Skills Training*

AUTHOR (YEAR)	STUDY DESIGN	PARTICIPANTS SETTING	PROCEDURES/ INTERVENTION	FINDINGS
Cihak, Fahrenkrog, Ayres, & Smith (2010)	Quantitative	4 elementary students diagnosed with Autism, age 6-8 Educational setting	Video Modeling	Students maintained an average level of 98% independent transitions 9 weeks after intervention
Martinez, Werch, & Conroy (2015)	Quantitative	Literature review 26 studies including 44 children ages 3-8 years old with autism	Instructional Interventions, Function-based Interventions, Antecedent-based Interventions, and Reinforcement Interventions	All the reviewed interventions were effective in decreasing the challenging behaviors exhibited by the participants.
Pane et al. (2015)	Quantitative	2 boys diagnosed with autism, age 10 & 15 Home and educational setting	Functional Assessments, Social Stories, & FCT	The results of a brief FA were used to develop a Social Story. The function-based social story plus FCT was effective in decreasing the target behavior

Behavioral Interventions

The complex pattern of impairments, heightened anxiety and stress, aggressive, and self-injurious behaviors create a significant challenge for caregivers and individuals with autism spectrum disorder. Functional communication training (FCT) is an evidence-based antecedent function-based intervention used to select and teach a replacement alternative skill that serves the same purpose as a problem behavior. Functional communication training can be broken into three steps: (a) identifying the function of the problem behavior through a functional behavior

assessment (FBA); (b) selecting an appropriate replacement communicative response; and (c) building new skills acquisition through teaching and rehearsal while using reinforcements and extinction (Wu et al., 2022).

Alakhzami and Chitiyo (2021) conducted a study to examine the effects of FCT on the self-injurious behavior of children with autism spectrum disorder (ASD) to find out if the results would be maintained during periods of nonreinforcement. The participants for their study were three children with a diagnosis of ASD between the ages of four and 14 years, that exhibited limited functional communication skills, and displayed self-injurious behaviors that were maintained by escape from demands as determined by functional behavior assessment and functional analysis. The self-injurious behavior the participants engaged in included head-banging and head-hitting. The study consisted of three phases. Phase One consisted of the Functional Behavior Assessment for each participant to collect information about whether or not the participant's self-injurious behavior (SIB) was maintained by escape from task demands and whether or not communication skills could become a robust replacement of SIB. Phase Two consisted of Functional Analysis (FA) which encompassed four conditions: contingent attention, contingent escape, tangible, and control. Phase Three was the treatment phase starting with baseline, functional communication training (FCT) pretraining, FCT plus demand fading, generalization, maintenance probes, and resurgence condition.

Results of the study indicated that the self-injurious behaviors decreased for all participants during the intervention sessions. The researchers also noted that the students maintained low levels of self-injurious behaviors (SIB) during the maintenance phase. One of the participants had a small increase in the level and trend of SIB in the maintenance condition, but it remained low and stable compared to their baseline levels. The results of this study revealed that using

alternative reinforcement (e.g., preferred items, praise) increased compliance and decreased negatively reinforced problem behavior without the use of extinction. One limitation of the study is that participants had different levels of communication abilities. Another limitation is the multiple baseline design required collecting the data over extended periods of time during the baseline (Alakhzami & Chitiyo, 2021).

Links between language skill and aggressive behavior are likely attributable to several reasons that vary across individuals, but functional accounts suggest that aggressive behaviors may serve a communicative function at times (Neuhaus et al., 2021). Neuhaus et al., (2021) conducted a study to explore language and communication skills in relation to aggressive behaviors in male and female youth with autism spectrum disorder (ASD). Participants included 145 youth with ASD ages eight through 17 years of age. Participants were recruited from clinics, schools, and community centers. All participants spoke English as their primary language. Researchers created a three-level multiple regression model with aggressive behavior as the dependent variable. At Level One of the model, child demographic variables of age and race were entered. At Level Two, family characteristics of annual household income, mother's education, and father's education were entered. At Level Three, child communication variables were entered.

Results suggest that challenges in applied or pragmatic communication skills may contribute to aggressive behavior by interfering with social interactions. Similarly, aggressive behavior may result from challenges in applied communication skills, either as an expression of frustration or as a tool used instrumentally as an alternative means of communicating a need. Improvements in functional communication skills correspond to reductions in aggressive behaviors for individuals with autism spectrum disorder (ASD) and other developmental

differences. Findings of their study must be interpreted in relation to the limitations of their data, which include a coarse measure of aggression that does not distinguish between finer forms of aggression (e.g., verbal vs physical, reactive, vs proactive) (Neuhaus et al., 2021).

Literacy-based behavioral interventions (LBBI) are similar to social stories, but do not have to follow the advocated guidelines (Anderson et al., 2016). Anderson et al. conducted a multiple base-line design study across three participants to investigate the effectiveness of literacy-based behavioral interventions for kindergarten and first grade students with ASD (2016). The three participants attended an elementary school in rural Georgia and were 5 and 6 years old. They were chosen because they met Georgia's eligibility requirements for either autism spectrum disorder (ASD) or significant developmental delay (SDD). The participants had difficulty expressing their needs and wants and exhibited physically aggressive behaviors of hurting self and/or others. Physical aggression was defined as yelling or screaming in the faces of adults and/or other students, hitting, kicking, biting, spitting, or throwing furniture. Intervention consisted of daily exposure to an individualized LBBI written specifically for each participant and narrated by an adult who knew the student. Prior to the start date of the study, data was collected and analyzed to determine the periods of occurrence and functions of physical aggression.

For all three participants the individualized story intervention decreased the number of episodes of physical aggression but there was a deceleration trend for only two of the participants upon initial introduction of the intervention. The results of this study indicate that a story that was written to be more directive was successful in teaching these students new behavior. Ethically, the least intrusive intervention that effectively changes behavior is the best choice. Literacy-based behavioral interventions or social stories can be unobtrusive and

effectively change behavior. This study was limited by sample size and demographics (Anderson et al., 2016).

Research to date indicates that parents often use multiple treatments simultaneously for their children with ASD (Lyndon et al., 2017). Lyndon et al., (2017) conducted a study to directly compare the effects of sensory integration therapy (SIT) and behavioral interventions. The participants were ten individuals with ASD ages 3-15. Participants attended a variety of settings including a special education school, public school, and special education preschool. Participants received two treatments in a counterbalanced sequence, each treatment was delivered, and data was recorded in ten daily sessions. In sequence 1 participants received SIT followed by behavioral intervention. Sequence 2 consisted of participants receiving behavioral intervention followed by sensory integration therapy. Sensory Integration Therapy (SIT) interventions for all participants were designed independent of the results of the behavioral assessment. All SIT recommendations were based on outcomes from sensory assessments. During the SIT condition, participants were provided with access to sensory integration equipment and activities that delivered sensory stimulation. Prior to the behavioral intervention a brief functional analysis was completed. Behavioral interventions were provided in a scripted format in the form of a Behavior Support Plan including environmental accommodations, direct interventions, skills teaching, and reactive strategies.

The C statistic was used to analyze the difference in trend in the two treatments. Overall, results reveal that behavioral interventions successfully reduced challenging behavior to low or near-zero levels. Sensory integration therapy (SIT) resulted in more variable rates of challenging behaviors. Lists of sensory integration (SI) techniques were recommended for each participant, but no order was provided for their delivery. Thus, the variability in the delivery of sensory

integration techniques may have contributed to the variable levels of challenging behavior observed during sensory integration therapy. Researchers concluded that function-based treatments are more effective in reducing challenging behavior. Limitations of this study included the availability of some participants prohibited the implementation of follow-up probes for some of the participants (Lyndon et al., 2017).

Table 3

Summary of Related Literature: Behavioral Interventions

AUTHOR (YEAR)	STUDY DESIGN	PARTICIPANTS SETTING	PROCEDURES/ INTERVENTION	FINDINGS
Alakhzami & Chitiyo (2021)	Quantitative	3 children with autism who displayed self-injurious behaviors, age 4, 14, & 13. Educational and home setting	FCT	FCT produced significant reductions in SIB and increased rates of appropriate communicative behavior. Resurgence of SIB occurred with extinction of reinforcement.
Anderson et. al. (2016)	Quantitative	3 children ages 5 & 6, with ASD or significant developmental delay. All had difficulty expressing themselves and exhibited physically aggressive behaviors. Educational setting	Literacy Based behavioral interventions (LBBI)	For all participants the individualized story intervention decreased the number of episodes of aggression but there was a deceleration trend for only two of the participants upon initial introduction of the intervention.

Table 3 (continued)

Lydon, Healy, & Grey (2017)	Quantitative	10 participants with ASD diagnosis, age 3-15 with challenging behaviors Educational setting	Behavioral Intervention & Sensory Integration Therapy	Results demonstrated that Behavioral Intervention was more effective in reducing levels of challenging behavior than sensory integration therapy.
Neuhaus et al. (2021)	Quantitative	145 youth, age 8-17 diagnosed with ASD, Clinical setting	DAS-II Core Language Score from Clinical Evaluation of Language Fundamentals, and Communication score from Vineland Adaptive Behavior Scales	Findings suggest that challenges in applied or pragmatic communication skills may contribute to aggressive behavior by interfering with social interactions. Similarly, aggressive behavior may result from challenges in applied communication as an expression of frustration or as a tool used as an alternative means of communicating a need.

Chapter 3: Summary and Implications

The purpose of this literature review was to investigate what intervention strategies have been found to be effective for elementary students with autism spectrum disorder to decrease physically aggressive and self-injurious behaviors. Chapter I provided an introduction to the topic that included historical background, the importance of the topic, and the focus of the review. Chapter II presented a review of the literature. This chapter discusses the findings of the research, including recommendations for future research and implications for current practice.

Summary

This literature review examined ten studies that researched the effectiveness of different interventions to help reduce aggressive or self-injurious behavior in children diagnosed with autism spectrum disorder (ASD). The studies were categorized into three groups for the purpose of the review, *Functional Behavior Assessment, Social Skills Training, and Behavioral Interventions*.

Three of the studies examined Functional Behavior Assessments (FBA's) or Functional Analysis (FA) (Von der Embse et al., 2011; Lewis et al., 2015; Camacho et al., 2014). Each of the studies looked at a different aspect of FBA's and FA's, but all of them demonstrate that collecting data to find the function of behavior is the first step to a solution. Theisen (2016) stated, "Discovering the reason for the challenging behaviors leads the educational team to proactive approaches. Making uniform decisions based on studies, reviews, and experience can guide the student's skills to decrease negative behaviors" (p. 35). Von der Embse et al. (2011) found that FBAs were a critical intervention when promoting inclusion for students with autism spectrum disorder (ASD). The study conducted by Lewis et al. (2015) examined whether the hypothesis generated by common FBA strategies matched the hypothesis generated through FA

trials. Unlike past research that showed inconsistencies across FBA measures and FA outcomes, the findings of this study were encouraging in that the FBA specialists generally generated similar hypotheses across rating scales, interviews, and direct observation. These results are promising for educators that create FBA's because Functional Analysis involves the direct experimental manipulation of variables under controlled trial conditions and are not feasible in the educational setting due to the lack of personnel with expertise to design and implement trials, the time involved in conducting multiple trial configurations, and the need for sophisticated direct observation data collection across trials. The study conducted by Camacho et al. (2014) had similar findings to the other studies. Camacho et al. examined the effectiveness of FBA and FA interventions on one student and found that it is feasible to conduct three kinds of functional behavior assessments in school and that functional behavior assessments lead to an effective behavioral intervention.

Three of the studies examined social skills training (Cihak et al., 2010; Martinez et al., 2016; Pane et al., 2015). Two of the articles, Cihak et al. and Pane et al. looked at specific interventions, while the study by Martinez et al., was a literature review examining the impact of school-based interventions designed to decrease challenging behaviors in young children with autism spectrum disorder (ASD). The findings that emerged from these studies also demonstrate the importance of finding or analyzing the function of the behavior.

Cihak et al, examined the use of video modeling to improve transitions for students with ASD. They found that video modeling resulted in independent transitions and decreased inappropriate behaviors during transitional situations. In order to implement video modeling, the educator or caregiver must first identify the target behavior and an appropriate replacement behavior. The study conducted by Pane et al. (2015) found that a social story that matched the

function of the behavior was effective in decreasing the target behavior and in teaching the participants to use the appropriate replacement behavior. The literature review by Martinez et al. (2016) found that social stories were the most frequently implemented instructional intervention.

Four of the studies examined behavioral interventions (Alakhzami & Chitiyo, 2021; Anderson et al., 2016; Lyndon et al., 2017; Neuhaus et al., 2021). Three of the studies examined specific interventions of functional communication training and literacy based behavioral interventions (Alakhzami & Chitiyo; Lyndon et al., 2017; Anderson et al. 2016). Neuhaus et al. (2021) examined the results communication has on aggressive behavior in individuals with autism spectrum disorder (ASD). Findings from these studies are similar to the previous results demonstrating the importance of finding and analyzing the function of the behavior

The study conducted by Neuhaus et al. (2021) suggested improvements in functional communication skills correspond to reductions in aggressive behaviors for individuals with autism spectrum disorder and other developmental differences. Alakhzami & Chitiyo (2021) examined functional communication training and found that it produced significant reductions in self-injurious behaviors. Anderson et al. examined Literacy Based Behavior Intervention and found that individualized story interventions that match the function of the behavior decreased the number of episodes of physical aggression. The results of the study conducted by Lyndon et al. suggested that behavioral interventions were more successful in reducing aggressive behavior in individuals with autism spectrum disorder than sensory integration therapy was.

Many of the studies in this literature review were limited with a small sample size. This may cause issues in validity because there is not as much data to compare. For this subject, a large geographical area would have to be covered to obtain larger samples. There would also be more data if I did not limit this literature review to studies with elementary age participants. The

studies that did not have a small sample size were literature reviews or combined and compared multiple different studies.

Recommendations for Future Research

Vast amounts of research have been conducted on autism spectrum disorder. A few of the studies in this literature review used technology-based interventions. Technology is always changing and becoming a part of the world we live in. Further research exploring the use of new and emerging technologies in the functional assessment process and interventions is warranted.

The results of this literature review demonstrated the importance of function based behavioral interventions. At times special education teams in the educational setting have difficulties determining successful interventions for individuals with autism spectrum disorder (ASD) exhibiting aggressive or self-injurious behaviors (Theisen, 2016). Further research could assess the practical aspect to which paraprofessional and/or special education teachers and caregivers can execute the function-based interventions, supports, and procedures.

The definition of aggression is subjective across studies (Fitzpatrick et al., 2016). Aggression can be defined as physical or verbal. Aggression can range from mild to severe with no consistent definition among researchers and studies. Individuals with autism spectrum disorder (ASD) may also engage in aggressive episodes toward themselves using self-injurious behavior. A clearer interpretation of data defining aggression to improve ease of comparison is warranted for future research.

This literature review was limited to therapeutic behavioral strategies. Pharmacological treatments and interventions were not included in this review. Further research should incorporate both therapeutic behavioral strategies and pharmacological treatments. Exploring

pharmacological treatments extends beyond the scope of this review and is also deeply personal for the caregivers of individuals with autism spectrum disorder (ASD).

Implications

Function based interventions and supports have been found to be successful in decreasing aggressive or self-injurious behaviors in elementary students with autism spectrum disorder. The insight gained from the research identified the importance of recognizing the ‘why’ of the behavior to determine how to help children that need additional supports to be successful and safe. Understanding the behavior guides the way to the strategies (Theisen, 2016). The individual education plan (IEP) teams have the job of finding what is motivating the behavior and determining effective interventions.

Educators and caregivers must be vigilant in choosing interventions and evaluating their effectiveness to meet the needs of this unique special education population. As an elementary special education teacher, working with students with ASD, it is important to implement interventions with fidelity. Students with autism spectrum disorder (ASD) need to feel supported. At times it is difficult for educators and caregivers to endure the results of aggressive or self-injurious behaviors that may be exhibited by individuals with ASD. However, if the team is deliberate and analyzes data for the function of the behavior, they will be able to find successful interventions within an inclusive environment. Recognizing the supports that need to be implemented will decrease the behavioral challenges. Finding effective and evidence-based interventions that assist students with ASD is crucial for their long-term success.

When special education teachers are leaving the profession, support staff are being brutally attacked, and families are placing their loved ones with ASD in residential facilities it is critical that educators and care givers find effective interventions to decrease physical aggression in their

students. Behaviors toward others and self-injurious behaviors are a way of communicating a need or want (Theisen, 2016). Individuals with autism spectrum disorder (ASD) may not have the words to express what they need or how they are feeling. Educators and caregivers have the task of becoming their advocates. There are effective strategies that educators and caregivers can implement to help reduce physically aggressive and self-injurious behaviors exhibited by individuals with ASD. Theisen (2016) stated “Support versus control creates a system of trust between the child, educator, and caregiver” (p. 39). The first step is always the most difficult, but when educators and caregivers devote their time to finding effective interventions for aggressive behavior in students with autism spectrum disorder the students can be successful and flourish.

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