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**Use of Alternative and Augmentative Communication with Students who are
Diagnosed with Autism Spectrum Disorder and who are also Nonverbal**

by

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Chapter I: Introduction and Statement of the Problem

This review examines the use of alternative and augmentative communication (AAC) with individuals who have Autism Spectrum Disorders (ASD). In Chapter I, alternative and augmentative description is described, and Autism Spectrum Disorders are defined both operationally and theoretically. In addition, the use of AAC devices and strategies with individuals who are diagnosed with ASD are promulgated as the foci for the review. In Chapter II, research addressing the use of AAC as an intervention for the academic and social deficits as an epiphenomena of ASD that appears in the literature of education and of psychology will be reviewed. In Chapter III, the findings from the analysis are summarized, and the implications of these findings will be described.

Introduction

Speech and language pathologists distinguish between augmentative and alternative communication (AAC). For both forms of AAC, therapies and assistive technologies may be used to improve or to facilitate the communication of individuals with impaired speech and language abilities. Although some therapies and assistive technology devices may be used for both augmentative and alternative communication, the severity of the impairment is used to operationally define augmentative communication and alternative communication (Light et al., 2019). Interventions for individuals who have some speech or speech that is difficult to understand are subsumed under the category of augmentative communication; interventions for individuals who lack speech are subsumed under the category of alternative communication. Impairments that necessitate the use of augmentative and alternative communication arise within an array of disabling conditions.

Autism Spectrum Disorder (ASD) is a type of developmental disorder. ASD is characterized by deficits in social functioning, in imaginative functioning, and in communicative functioning (Centers for Disease Control and Prevention, 2020). The term spectrum connotes a range. With ASD, the social, imaginative, and communicative deficits range from mild to severe. Within the area of communication, the deficits may range from milder pragmatic language deficits to an absence of speech.

Historical Overview

Kanner (1943) provided the first clinical description of ASD. His description included three elements that remain characteristic of ASD. First, Kanner clearly differentiated ASD from childhood onset schizophrenia. Second, he identified behaviors that would become known as the Autism Triad: social deficits, imaginative play deficits, and communication deficits. Third, he noted the presence of stereotypical play and communication. Many of Kanner's observations were incorporated into the criteria used in the APA (American Psychological Association) Diagnostic and Statistical Manual (DSM) for the diagnosis of ASD. The DSM criteria for ASD appear in the glossary of this proposal.

AAC emerged in the 1950s and 1960s as an avenue for communication for those individuals who had not developed the more traditional communication skill of speech. During its brief history, AAC has undergone remarkable changes. For example, the fundamental nature of assessment in AAC has evolved from a candidacy model, in which persons were to demonstrate eligibility for an AAC system by attaining certain prerequisite skills, to the contemporary universal model, which is based on the premise that anyone can communicate and benefit from AAC services. Similarly, the essential philosophy of AAC service provision has

evolved from a focus on isolated skills taught during pullout therapy to an inclusive model, wherein functional communication skills are taught within natural environments.

Statement of the Problem

A subset of individuals with ASD experience social and communication deficits. These deficits affect their performance in the classroom, their social interactions, and their abilities to function and complete daily living activities. This paper examines these deficits and how diverse types of AAC when individualized to fit an individual's needs may help them overcome challenges arising from impairments in pragmatics and in expressive language. This paper reviews ASD comorbid with speech and language impairments.

Discussion of Practical Consequences

In this section, I address the potential applied outcomes for this paper. The findings from this paper may have implications for students and teachers. Students with ASD who are primarily nonverbal may benefit from using an AAC device to communicate more effectively their wants and needs to complete daily living activities more independently. Students who are verbal and trying to interact with a nonverbal student could also benefit from listening and paying attention to an AAC device. Students who are verbal could effectively have a conversation with a nonverbal student using an AAC device by listening and asking appropriate questions that they can answer with their device.

Teachers could benefit from using AAC devices with nonverbal ASD students. When evaluating or progress monitoring a student who is nonverbal, students can use their AAC device to answer questions. The questions need to be appropriate to what is programmed onto their specific device. Using an AAC device not only shows the teacher that they know the answer to a

question but also shows comprehension. Such an approach provides students with a voice rather than always using manual communication.

Glossary

Several terms are used in this review that are uniquely defined or have delineated clinical definitions. These terms are included in this glossary. The terms are arranged alphabetically.

Augmentative and Alternative Communication (AAC) includes approaches that allow people with severe speech or language impairments to communicate with other people in modalities other than talking to them.

Many types of Augmentative and Alternative Communication are extant. No-tech and low-tech options include gestures and facial expressions, writing, drawing, spelling words by pointing to letters, and pointing to photos/pictures/written words. High-tech options include using an app on a tablet, using a computer with a “voice” (speech-generating device).

Autism Spectrum Disorder (ASD) is a developmental disability that can cause significant social, communication, and behavioral challenges. The following table depicts the DSM Criteria used for diagnosing ASD.

Table 1*DSM Criteria for Diagnosing ASD*

The criteria in the DSM-5 for diagnosing ASD include 3 listed deficits in social communication and social interactions. Clinicians must be sure that these characteristics are not due to developmental delay alone. To be diagnosed with ASD, an individual must meet all three of the following criteria:

1. Difficulties in social emotional reciprocity, including trouble with social approach, back and forth conversation, sharing interests with others, and expressing/understanding emotions.
2. Difficulties in nonverbal communication used for social interaction including abnormal eye-contact and body language and difficulty with understanding the use of nonverbal communication like facial expressions or gestures for communication.
3. Deficits in developing and maintaining relationships with other people (other than with caregivers), including lack of interest in others, difficulties responding to different social contexts, and difficulties in sharing imaginative play with others.

The criteria in the DSM-5 also include demonstrating at least two (2) of the following four (4) restricted and repetitive behavior, interests, or activities:

1. Stereotyped speech, repetitive motor movements, echolalia (repeating words or phrases, sometimes from television shows or from other people), and repetitive use of Rigid adherence to routines, ritualized patterns of verbal or nonverbal behaviors, and extreme resistance to change (such as insistence on taking the same route to school, eating the same food because of color or texture, repeating the same questions); the individual may become greatly distressed at small changes in these routines.
2. Highly restricted interests with abnormal intensity or focus, such as a strong attachment to unusual objects or obsessions with certain interests, such as train schedules.
3. Increased or decreased reactivity to sensory input or unusual interest in sensory aspects of the environment, such as not reacting to pain, strong dislike to specific sounds, excessive touching or smelling objects, or fascination with spinning objects.

Under DSM-5, ASD is now diagnosed by symptoms based on both the current functioning and past functioning of an individual. These new observational criteria will allow clinicians to diagnose people who may have shown some signs early in development, but whose symptoms did not become clear until adolescence or adulthood.

Speech-language pathologists (SLP) work to prevent, assess, diagnose, and treat speech, language, social communication, cognitive-communication, and swallowing disorders in children and adults.

Chapter II: Review of the Literature

This review examines the use of alternative and augmentative communication (AAC) with individuals who have Autism Spectrum Disorders (ASD). In Chapter I, alternative and augmentative description were described, and Autism Spectrum Disorders were defined both operationally and theoretically. In addition, the use of AAC devices and strategies with individuals who are diagnosed with ASD were promulgated as the foci for the review. In Chapter II, research addressing the use of AAC as an intervention for the academic and social deficits as an epiphenomena of ASD that appears in the literature of education and of psychology is reviewed. In Chapter III, the findings from the analysis are summarized, and the implications of these findings will be described.

Introduction

Alternative communication and augmentative communication (AAC) have been investigated widely. Augmentative communication allows an individual who has severe speech or language impairments to communicate with other people via modalities other than the individual's extant speech and language corpus. Alternative communication addresses the needs of individuals who are nonverbal. Studies investigating AAC appear in the literature of education, of medicine, and of psychology. Within this broad body of literature, studies addressing AAC to address the needs of individuals who have Autism Spectrum Disorders (ASD) is the specific focus of this review.

Scope of the Review

I searched the Academic Premier database and the Google Scholar database computationally. I used several sets of descriptors to locate studies. First, I searched Academic

Premier database using Augmentative and Alternative Communication as a search term. When I completed the search using Augmentative and Alternative Communication as the descriptor, I received 2,032 hits. To reduce the number of retrieved materials, I conducted a subsequent search using “Augmentative and Alternative Communication” and “ASD” as combined search terms. When I completed the search using “Augmentative and Alternative Communication” and “ASD” as the descriptors, I received 103 hits. Second, I searched Academic Premier database using History of Augmentative and Alternative Communication as a search term. When I completed the search using History of Augmentative and Alternative Communication as the descriptor, I received 7 hits. Next, I searched Google Scholar database using Augmentative and Alternative Communication as a search term. When I completed the search using Augmentative and Alternative Communication as the descriptor, I received 39,700 hits. To reduce the number of retrieved materials, I conducted a subsequent search using “Augmentative and Alternative Communication” and added a custom year range for 2000-2021. When I completed the search using “Augmentative and Alternative Communication” as the descriptor and a custom year range of 2000-2021, I received 18,300 hits. Lastly, I searched Google Scholar database using ASD and AAC devices as a search term. When I completed the search using ASD and AAC devices as the descriptor, I received 6,250 hits.

Presentation of the Findings

The findings are presented thematically. First, literature that defines and addresses the importance of AAC and is presented. Second, literature describing nonverbal people with ASD and their communication deficits is reviewed. Finally, literature concerning the effectiveness of AAC, specifically alternative communication, for nonverbal people with ASD is examined.

Definitions and Defining Issues

Augmentative and alternative communication (AAC) includes systems designed to supplement or replace spoken or written communication for individuals with temporary or permanent communicative impairments (Cafiero, 2011). AAC can be divided into two types: aided and unaided. Unaided AAC may be implemented without supplemental aids using gestures and sign language or by using other instruments such as pictures, writing, or speech generating devices. Hourcade et al. (2004) describe prominent components in the development of support services for individuals with disabilities, especially those who have severe disabilities. Historically, the choice of communication system often was based on the belief that individuals with severe physical disabilities would benefit most from aided systems, whereas persons with severe cognitive disabilities with lesser levels of physical disability should use unaided systems. This principle changed with the recognition that the combination of aided and unaided communication systems yielded enhanced communicative power. This was a milestone in language intervention philosophy (Musselwhite & St. Louis, 1988).

Teachers and therapists determined that the choice between an aided versus unaided system was of minor consequence compared to the importance of implementing the chosen system within the natural routines that would result in functional communication (Ronski & Sevcik, 1988). Language intervention efforts focused on designing multicomponent systems that reflected the practical needs of the child based on the communication demands of his or her environment (Musselwhite & St. Louis, 1988; Zangari et al., 1994). Examples of the best practices for such approaches included the identification and the provision of detailed educational strategies and individualized communication competencies (Musselwhite & St.

Louis, 1988). Within the framework, interventionists began successfully integrating aided and unaided communication modes, e.g., sign language combined with picture communication symbols (Romski & Sevcik, 1988).

The greatest change in augmentative and alternative communication has been the near-universal abandonment of prerequisites for AAC services. This has occurred largely because of the lack of compelling empirical research supporting the requirement that certain cognitive prerequisites be present prior to beginning effective augmentative communication services (Kangas & Lloyd, 1988; Romski & Sevcik, 1988). This opens the door to provision of AAC services for all persons, regardless of the severity of their disabilities. As Mirenda (1993) noted, communication is not something that has to be learned; people must communicate.

The primary emphasis of communication intervention has shifted to the acquisition of functional communication skills within natural environments. Although structured approaches are still utilized, best practices today emphasize functional language skills within natural daily routines and natural environments (Beukelman & Mirenda, 1998; Calculator & Jorgensen, 1991). Functional communication is “the actual use of language to achieve predetermined purposes. To be functional, language must influence others’ behaviors and bring about effects that are appropriate and natural in each social context” (Calculator & Jorgensen, 1991, p. 204).

Picture Exchange Communication Systems and Contemporary Technologies

A good example of a contemporary approach to functional communication is the Picture Exchange Communication System [PECS] (Bondy & Frost, 1994). The PECS program teaches learners to request and to comment by giving picture cards to a communication partner. Prerequisite skills, such as recognition of picture symbols or the ability to communicate

intentionally through non-symbolic means, are not required (Harwood et al., 2002). The effectiveness of PECS with individuals having autism (Charlop-Christy et al., 2002; Kravits et al., 2002; Liddle, 2001) has also been demonstrated with preschool children with developmental disabilities (Bock & Stoner, 2003), cortical blindness, traumatic brain injury, and encephalopathy (Judd-Wall, 2001), and adults with developmental disabilities (Beck et al., 2002).

In the past, limitations in the available technologies often meant that the opportunity to use AAC systems using voice-output devices was not extended to persons who had severe disabilities. Continued improvement in available technology has made access to voice output more possible for persons with severe disabilities. Within recent years, interventionists have come to a greater recognition of the advantages of voice-output communication devices for persons with severe disabilities (Mirenda, 1993; Schepis et al., 1998). Visual discrimination is not a factor in understanding or using voice output communication aids, making them easily understood by both familiar and unfamiliar listeners (Schepis et al., 1998). Furthermore, it is simpler to initiate interaction because the listener does not have to be in near proximity or understand the function of the device. When the provision of AAC communication systems has been accompanied by appropriate instructional strategies, individuals with significant disabilities have acquired sophisticated and functional communicative skills in a variety of areas. These include requesting desired objects, attention, or access to activities (Cipani, 1990; Hall & Sundberg, 1987; Sigafoos et al., 1989) and refusal of offered items or events (Drasgow et al., 1996).

The widespread use of AAC systems among persons with severe and multiple disabilities only began in the 1980s. The range and capabilities of AAC technologies and strategies have

grown impressively, particularly in the past decade. Future directions should include the development and refinement of increasingly appropriate and user-friendly communication devices and further development of possibilities for persons with severe cognitive, sensory, and physical disabilities.

Ganz et al. (2012) completed a meta-analysis that investigated how individual characteristics moderate the effectiveness of three types of aided AAC: the Picture Exchange Communication System (PECS), speech-generating devices (SGDs), and other picture-based AAC. Effectiveness was measured via the Improvement Rate Difference (IRD). Individuals with Autism Spectrum Disorders (ASD) and complex communication needs often rely on augmentative and alternative communication (AAC) as a means of functional communication. The results of their meta-analysis indicated that AAC has small to moderate effects on speech outcomes. SGDs are most effective when considering any outcome measure with individuals who have ASD in the absence of comorbid intellectual/developmental disorders (IDD). PECS is most effective when considering any outcome measure with individuals with ASD and IDD. SGDs and PECS were the most effective type of AAC for preschoolers. No difference was found between systems for elementary-aged and older individuals.

PECS was more effective for individuals who exhibited features of both Autism and intellectual delays rather than for individuals with ASD who did not exhibit an intellectual delay. No statistically significant difference was found between the effectiveness of speech generating devices between participants with an ASD and participants with an ASD and IDD. The lack of overlap indicates a statistically significant difference exists when another picture based AAC is implemented with participants with an ASD yielding a greater magnitude of change.

Light et al. (2019) studied new and emerging research-based augmentative and alternative communication (AAC) technologies that are developmentally appropriate and responsive to the individual interests, needs, and skills of children with developmental disabilities. The needs and the goals of their families, peers, and other communication partners were also examined.

Approximately 97 million individuals worldwide have significant disabilities that impede or preclude the development of functional speech (as reported in Beukelman & Mirenda, 2013; United Nations, 2017). This population includes children with cerebral palsy, Down Syndrome, intellectual developmental disabilities (IDD), autism spectrum disorder (ASD), and other developmental disabilities. Without access to functional speech, these children are severely restricted in their current and future participation in education, employment, healthcare, family life, and community activities; they are at risk in all aspects of development (Light, 1997). Unless children who have complex communication needs are provided with effective intervention, the negative effects of disability are compounded even further by missed opportunities for interaction and learning (Ronski & Sevcik, 2005).

Augmentative and alternative communication, e.g., signs, communication boards, speech-generating devices, mobile technology with AAC apps, offers significant promise to enhance the communication of children with complex communication needs. The goal of AAC intervention is to enhance communicative competence. The development of communicative competence is impacted by numerous factors, including those related to the child, the environment, and the communication partners as well as the AAC system (Light & McNaughton, 2014).

Autism Spectrum Disorders: A Brief Introduction

Autism Spectrum Disorder (ASD) is a type of developmental disorder. ASD is characterized by deficits in social functioning, in imaginative functioning, and in communicative functioning (Centers for Disease Control and Prevention, 2020). The term spectrum connotes a range. With ASD, the social, imaginative, and communicative deficits range from mild to severe. Within the area of communication, the deficits may range from milder pragmatic language deficits to an absence of speech.

Espelöer et al. (2020) which examines the relationship between two clinical constructs: “social anxiety” and “social competence” in autism spectrum disorder. The researchers used two questionnaires: SASKO and the Intolerance of Uncertainty (IU). The authors report that individuals with ASD showed increased levels of social anxieties (SASKO) and of intolerance of uncertainty (IU) compared to their peers who do not have disabilities. Social anxiety scores were equally increased for ASD and for a reference population of individuals with social anxiety disorder (SAD; $n = 68$). However, results showed increased social competence deficits in people exhibiting ASD relative to individuals with social anxiety. The authors conclude that social anxiety symptoms in ASD can be traced back to autism-specific deficits in social skills and are therefore putatively based on different, substantially “deeper” implemented cognitive mechanisms.

Banker et al. (2021) identify the principal language impairment of individuals with ASD as social functioning. This review summarizes the evidence that supports a role for the hippocampus in the pathophysiology of ASD. Though limited in number, the few studies highlighting hippocampal function in ASD provide concrete evidence of disrupted activity. In

addition to these direct assessments, numerous factors indicate that hippocampal dysfunction may contribute to the ASD phenotype. The hippocampus reaches a milestone of functional maturity at the same age ASD symptoms begin to manifest and thus, suggests a developmental link. Indeed, structural alterations of the hippocampus are widely observed in children and adolescents with ASD; this suggests an atypical formation of the structure and its connections with the rest of the brain. Furthermore, the hippocampus is known to play critical roles in social interaction, memory, and spatial reasoning. Each of these functions is disrupted in ASD. Social interaction deficits are among the most central but also the most poorly understood aspects of the disorder. The authors hypothesize that hippocampal contributions to these distinct behaviors occur through cognitive mapping that represents the organization of concepts and binding of relational elements. A disruption in cognitive mapping would lead to deficits in model-based planning and affordance perception. Both skills are impaired in ASD. Through such mechanisms, atypical hippocampal development may cause significant impairment in social, memory, and spatial domains. These deficits form elements of the ASD phenotypes.

Alternative Communication for Individuals Diagnosed with ASD who are Nonverbal

In this section, the literature concerning the effectiveness of AAC, specifically alternative communication, for nonverbal people with ASD is reviewed and presented. van der Meer et al. (2013) compared the acquisition of multi-step requesting and social communication across three AAC options: manual signing (MS), picture-exchange (PE), and speech-generating devices (SGD). Individual preference for each option was also assessed. The participants were two children with Autism Spectrum Disorders (ASD) who had previously been taught to use each option to request preferred items. Intervention was implemented in an alternating-treatments

design. During baseline, participants demonstrated low levels of correct communicative responding. With intervention, both participants learned the target responses (two- and three-step requesting responses, greetings, answering questions, and social etiquette responses) to varying levels of proficiency with each communication option. One participant demonstrated a preference for using the SGD and the other preferred PE.

Children with Autism Spectrum Disorders (ASD) who do not speak or have limited verbal abilities are commonly taught to use augmentative and alternative communication (AAC) options such as manual signing (MS), picture exchange (PE), and speech-generating devices (SGDs; Ganz et al., 2012; Mirenda, 2003). Researchers (e.g., Flippin et al., 2010; Rispoli et al., 2010; Wendt, 2009) have demonstrated that children with ASD can learn to use each of these three options. Studies that have compared the acquisition rates of various AAC options provide evidence that individuals demonstrate variation in their learning of specific AAC technologies (e.g., Beck et al., 2008; Gregory et al., 2009; Sigafos & Drasgow, 2001). Because a variety of AAC systems appear to be effective for at least some individuals, AAC team members may find it difficult to determine the best option for a particular individual, and therefore, the effects a preference for different AAC options might have on learning other communication skills are unclear.

To investigate this question, van der Meer and their colleagues studied teaching new and more advanced communication skills to two children, Ian and Hannah who had participated in the van der Meer et al. (2012) study. Both participants had previously learned to use MS, PE, and SGD to make a one-step request for access to preferred stimuli, and both showed a preference for using one of these communication options. Ian preferred the SGD, and Hannah preferred the PE.

Three questions guided the study. First, could the participants learn more complex and socially oriented communication skills with each AAC system? Second, does the preference for one AAC system over the other two remain stable or change with the introduction of more advanced communication skills? Third, if children learn new and more advanced communication skills with each AAC system, does preference influence how efficiently they learn the new skills? Based on previous findings (van der Meer, Didden et al., 2012; van der Meer et al., 2013; van der Meer et al., 2012), the authors predicted that enabling participants to choose which AAC option to use would enhance the success of the intervention in terms of speed of acquisition. Furthermore, the use of a preferred AAC option was also expected to translate into a higher percentage of correct communicative responses during follow-up sessions.

Procedures previously used to teach these two children a beginning requesting response using MS, PE, and SGD options (van der Meer et al., 2012) were applied to teach a set of new and more advanced communication skills. In relation to the first research question, results suggest the procedures were moderately successful in teaching two-step requesting for both participants, as well as three-step requesting and the more social communication skills of (a) initiating greetings, (b) answering questions, and (c) using etiquette for one of the participants. The study extends previous research (van der Meer, Didden et al., 2012; van der Meer et al., 2013; van der Meer et al., 2012) by demonstrating an approach that was successful for one participant in expanding the communicative forms and functions that can be expressed with MS, PE, and SGD. In answer to the second research question, the study also supports and extends previous research by showing that the children's preferences for the three AAC options were consistent with that shown during their previous initial intervention. In other words, Ian's

preference for the SGD and Hannah's preference for PE were the same as shown in the van der Meer et al. study. This is an important finding because it suggests that a child's preference for using an AAC option remains stable even when they are taught new and more advanced/social communication forms and functions.

Assessing children's preferences for different AAC options might be important with respect to the issue of inappropriate AAC device abandonment, a widespread problem in the AAC field (Johnson et al., 2006). Logically, one might expect that preferred AAC options would be less likely to be abandoned. Thus, assessment of preference for different AAC options may be an alternative to an approach in which clinicians select an AAC option that seems suited to the child (viz., easiest for the child to learn), but it might not be preferred by the child and/or other stakeholders.

Chavers et al. (2021) wanted to determine the effects of augmentative and alternative communication intervention using a speech-generating device on the acquisition, the maintenance, and the generalization of multistep requesting and generic small talk in three children with severe ASD. A multiple-baseline design across participants combined with a posttreatment multiple-generalization probe design was used to assess acquisition, generalization, and maintenance of target communicative behaviors with the experimenter and the participants' familiar communication partners (FCPs). Intervention was composed of systematic instruction in the use of an SGD using least-to-most prompting, constant time delay, error correction, and reinforcement. Visual analysis established a strong functional relationship between the independent variable and the two dependent variables (i.e., requesting preferred activities, engaging in generic small talk) for all three participants. Effect size indicator analyses

corroborated these findings, indicating strong effects for performing multistep requesting and medium effects for engaging in generic small talk. All participants were able to generalize the acquired communicative behaviors to request new and untrained snacks and activities and engage in generic small talk with FCPs who were not part of the training. Maintenance of acquired communicative behaviors was demonstrated 3 weeks post-completion of intervention. This study provides preliminary evidence that AAC intervention using an SGD and incorporating least-to-most prompting, constant time delay, error correction, and reinforcement is effective in terms of multistep requesting and generic small talk behaviors in children with severe ASD.

Clarke and Williams (2020) examined whether speech-language pathologists (SLPs) who work with children with ASD consider processing differences in ASD or the effects of input during their instruction. Following a qualitative research method, how SLPs instruct and present augmentative and alternative communication systems to individuals with ASD, their rationale for method selection, and their perception of the efficacy of selected interventions were investigated. Semi-structured interviews were conducted as part of an in-depth case report with content analysis. Based on completed interviews, four (4) primary themes were identified: (a) instructional method, (b) input provided, (c) decision-making process, and (d) perceived efficacy of treatment. Additionally, one secondary theme, training and education received, was identified. Clinicians reported making decisions based on the needs of the child; however, they also reported making decisions based on the diagnostic category that characterized the child (i.e., ASD). The use of modeling when teaching augmentative and alternative communication to individuals with ASD emerged as a theme, but variations in the method of modeling were noted.

SLPs did not report regularly considering processing differences in ASD, nor did they consider the effects of input during instruction.

Chapter III: Summary and Implications

Several patterns within the authorship of the articles emerged. Kanner wrote the seminal studies on ASD and the social deficits that impact a person with ASD. His articles began appearing in 1943. Several researchers contributed significantly to the literature on AAC. AAC emerged in the 1950s and 1960s as an avenue for communication for those individuals (people with significant disabilities) who had not developed the more traditional communication skill of speech. Several researchers also contributed significantly to the literature on the uses of AAC among people with ASD. The participants in the studies are school-age children with severe disabilities, mostly children with ASD.

The inclusion of deficits in social skills are crucial to prevent misinterpretation of autistic symptoms such as social anxiety disorder (SAD). Social deficits in ASD might cause repeated social failure due to the perceived complexity of social interactions, which in turn might cause supposed symptoms of social anxiety as well as social isolation. In the case of ASD, we can make further plausible that it is the lack of social competence that leads to the avoidance of social situations rather than a disinterest in social contact. Indeed, many people with ASD express a desire for social belonging to different communities.

Elevated social anxiety in both groups point out on the one hand the occurrence of social anxiety symptoms in ASD and on the other hand the problem of precise delimitation. Avoidance behavior occurs in both, individuals with ASD and individuals with SAD, but in the latter, social anxiety visible on a superficial level may cover preserved social skills, whereas ASD is characterized by mentalizing deficits on a fundamental level hampering social information

processing. This difference is shown by significantly increased deficits in processing social information in ASD in comparison to the SAD group. In SAD, mentalizing is generally preserved, but individuals with SAD do not fully succeed in adequately evaluating social situations, which may result in dysfunctional reactions. Impaired mentalizing in ASD calls for modified interpretations of the concept of social anxiety.

The outcomes of this review suggest that SGD-based systematic instruction (i.e., constant time delay, least-to-most prompting, and differential reinforcement) leads to gains in multistep requesting and responding to greetings/farewells and simple questions in children with severe ASD.

In summary, Chapter I of this paper is where you can find definitions and groundwork. Augmentative communication (aided) is used with people that have some speech but might be difficult to understand their words. Alternative communication (unaided) is used with people who are completely nonverbal. Autism Spectrum Disorder is a disorder that commonly creates deficits in communication and social skills. Chapter II is the literature review. The articles read are centered around the history of AAC, the history of ASD, and the use of AAC with nonverbal people with ASD. The key concepts that I learned in my research is that AAC has been around for a long time but has definitely progressed over time. PECS and SGD's are typically the most effective with preschoolers and can continue with school age kids and even adults. AAC is developed according to the individual needs and skills. It is important to consider the person's preference when choosing an AAC option and expose them to many options.

The most important implications that have been studied during this review are the suggestions on how to pick out an AAC device. The articles that I read suggest that when

considering an AAC device, you should consider the instructional methods, the child and family input, and the skills and needs of the person using the device.

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