Autism Spectrum Disorder (ASD) and Augmentative and Alternative Communication (AAC)

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Superheroes social skills training, rethink autism internet intervention, parent training, evidence-based practices classroom training, functional behavior assessment: An autism spectrum disorder, evidence-based practices training track for school psychologists

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Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by impairments in social communication and reciprocal social interaction, as well as stereotyped behaviors and interests (American Psychiatric Association, 2013). It is estimated that approximately 1 in 68 children in the United States have ASD, with a significantly larger number of males identified compared to females (Centers for Disease Control and Prevention, 2014). Data from the Annual Disability Statistics Compendium published by the Rehabilitation Research and Training Center on Disability Statistics and Demographics (StatsRRTC; 2013) further identified that 8.4% of special education students (ages 6 to 21) receive services under the educational classification of autism. This proportion represents approximately 476,000 children in the United States (StatsRRTC, 2013); however, it is important to note that these statistics solely represent the child's primary special education classification. For example, a child with ASD who has comorbid diagnosis of intellectual disability (ID) may be represented under the ID or multiple disabilities (MD) classifications but not under the autism classification. In addition, a child who has a diagnosis of ASD may not be represented in any category at all if specialized instruction and services are deemed unnecessary by the educational team, including parents (U.S. Department of Education, 2015). Given the proportion of children in the United States who have ASD, it is imperative that providers better understand the disability, including common comorbid disorders and effective treatments.

ASD and Comorbid Disorders

It is estimated that approximately 70% of individuals with autism have at least one comorbid disorder and that 41% have more than two comorbid conditions (Jang & Matson, 2015). Common conditions include the following: ID; speech/communication impairment;

attention-deficit/hyperactivity disorder (ADHD); mood and behavior disorders; anxiety,

obsessive-compulsive disorder (OCD), and specific phobias; gastrointestinal disorders; sleep

disturbances; and epilepsy (Tsai, 2014; Matson & Nebel-Schwalm, 2007; Manninon, Leader, &

Healy, 2013; Lubas, Mitchell, & De Leo, 2014). While it is crucial to accurately assess and

identify all comorbid symptoms, this is especially true for two specific conditions: ID and

significant speech impairment.

The Center for Disease Control and Prevention (CDC; 2014) recently estimated that 31%

of youth with ASD have intellectual skills in the ID range (IQ = ≤70). Of the remaining youth,

23% have intelligence quotient (IQ) scores that fall within the borderline range (IQ = 71-84) and

46% are estimated to have average or above average IQ scores (IQ = ≥ 85). Specifically, ID is

characterized by social, cognitive, and adaptive skill deficits. Researchers have further

determined that as IQ goes down for individuals with ASD, the likelihood of challenging

behaviors increases (Matson & Shoemaker, 2009). Behaviors may include self-injury,

aggression, and stereotypies, among others. The risk of challenging behaviors ultimately

highlights the unique needs of children who have both ID and ASD (Matson & Shoemaker,

2009). The American Psychiatric Association (APA; 2013) outlines the following diagnostic

criteria for ID: (1) deficits in intellectual functions confirmed by both clinical assessment and

individual, standardized intelligence testing, (2) deficits in adaptive functioning across multiple

environments that limit personal independence and social responsibility, and (3) onset of

intellectual and adaptive deficits during the developmental period. Severity levels, ranging from

mild to profound, are described in further detail and are defined based on adaptive functioning

(APA, 2013). In general, individuals with comorbid ID and ASD are reported to thrive less than

their peers with ID alone, emphasizing the need for appropriate interventions and supports. Environmental supports and social inclusion in community settings appear to be particularly important along with interventions that target core ASD symptoms, including social communication deficits (Weiss & Burnham Riosa, 2015).

Individuals with ASD also experience communication difficulties, with variation noted in specific symptoms and severity. To date, it is estimated that approximately 25-30% of individuals with ASD are minimally verbal (Lubas, Mitchell, & De Leo, 2014). This prevalence rate is much lower than once believed, with past estimates stating that over half of all children with ASD would not acquire language. This decrease is likely due to changing diagnostic criteria and the emphasis now placed on early identification and intervention. Still, no single explanation accounts for all minimally verbal children with ASD and heterogeneity clearly exists among the cognitive and linguistic profiles. In some instances, minimally verbal children lack all spoken language, consisting of only atypical non-speech sounds and vowel approximations. In other cases, their expressive language is extremely limited and consists of a few words or fixed phrases, such as "want X." Other individuals in this category may be primarily echolalic or use stereotyped or scripted language in ways that are non-communicative. Researchers have found that useful speech by age five consistently predicts better social and adaptive functioning later in life (Tager-Flusberg & Kasari, 2013), and that spontaneous, functional communication also allows children to access and learn from their environment (Lubas, Mitchell, & De Leo, 2014). Given the importance of communication, it is clear why effective communication interventions have been, and are, a high priority.

Augmentative and Alternative Communication (AAC)

In the past 45 years, numerous augmentative and alternative communication (AAC) interventions have been created and implemented in an effort to meet the complex communication needs of youth with ASD (Lubas, Mitchell, & De Leo, 2014). Cafiero and Meyer (2008) define AAC as "any tool, strategy, or technology that compensates for, enhances, expands or helps develop communication skills" (p. 28). AAC tools and strategies are often explicitly taught and incorporated into speech and language therapy, which is one of the most frequently used therapies to address the communication deficits associated with ASD. Not surprisingly, speech and language therapy is one of the top five most commonly reimbursed services (currently reimbursed in 37 states) for children with Medicaid (Semansky, Xie, Lawer, & Mandell, 2013). Due to the number of individuals and families accessing speech and language therapy, as well as the evolving nature of AAC over the past several decades, a brief overview of the history of AAC is certainly warranted.

According to Lubas, Mitchell, and De Leo (2014), first attempts to augment the communication of individuals with ASD began in the 1970s with non-technological tools, such as sign language and gestural symbols. Soon after, the Picture Exchange Communication System (PECS) was developed to help individuals with ASD communicate utilizing photographs and drawings as communication symbols. PECS became a quickly preferred system because the pictures allowed for a longer processing time for the communicator. Moreover, PECS was found to improve functional communication and spontaneous initiations of children with ASD. Despite noted benefits, it was clear that PECS left room for improvement. Consumers realized that creating and storing laminated images as children's language grew was both time-consuming and

difficult. This realization gave way to various AAC technologies.

The first devices were dedicated speech-generating devices (SGDs) with pre-loaded software, which were introduced into schools in the early 1990s. Parents, teachers, and school systems soon learned, however, that dedicated SGDs were expensive, difficult to personalize, and even stigmatizing for the child. In an effort to provide a more affordable and convenient tool, AAC apps were developed. AAC apps are not only more affordable and customizable; they are also more accessible, especially with the growing presence of smartphones and tablets in our world today. As of February 2014, the Apple Store had more than 250 AAC apps that ranged in price from free to a few hundred dollars (Lubas, Mitchell, & De Leo, 2014). The number of available apps continues to rise, increasing opportunity for use by individuals with ASD. Today, AAC systems are largely divided into two separate categories: (1) unaided systems and (2) aided systems.

<div style="text-align:center">Unaided and Aided Systems</div>

Unaided systems are those that are non-electronic and require no external equipment, such as gestures, body language, and sign language (Gevarter et al., 2013; Ganz & Simpson, 2004). These systems are often used less than aided systems for two major reasons. First, many children with ASD experience difficulty with imitation, perspective taking, and fine motor skills, making it frustrating to both learn and consistently use manual signs. Next, the use of unaided systems often presents a continued communication barrier with peers, teachers, and members of the community. Nevertheless, some individuals with ASD show preference for, and great success with, unaided systems (Ganz & Simpson, 2004; Ganz et al., 2012).

It is most important to remember that no single system best meets the diverse needs of all

children with ASD (Tincani, 2004). Learner characteristics should be assessed, and the intended

goals and desired outcomes of the AAC intervention should be clearly outlined in order to ensure

that the most effective and efficient system is chosen. Systems that present accessibility and

mobility challenges are likely to be ruled out early in the AAC assessment process (Gevarter et

al., 2013).

Communicator preference is also a crucial aspect of intervention to consider. Research

suggests that most individuals with developmental disabilities show a preference for aided

systems, specifically SGDs, and also tend to acquire these systems quicker (Gevarter et al.,

2013). Using a person's preferred communication modality has been found to improve learning

and maintenance, with problem behavior occurring less frequently. In contrast to unaided

systems, aided systems are those that require external equipment, such as PECS and SGDs

(Gevarter et al., 2013). A greater discussion of specific aided systems is warranted given the

popularity and wide variety of choices available to consumers.

<div align="center">Picture Exchange Communication System (PECS)</div>

PECS is a communication system that was initially created for children with ASD

(Bondy & Frost, 2001). The system "uses pictures as a means for the user to communicate with

others by handing a picture or pictures to another individual" (Ganz et al., 2014, p. 517). Due to

the motivating nature of tangible outcomes for children with ASD, the system starts by teaching

requesting, which is the first of six phases. Each phase combines theory and practices of both

behavioral and developmental perspectives, and the principles of applied behavior analysis, such

as distinct prompting, reinforcement, and error correction, are heavily relied on for teaching

(Bondy & Frost, 2001).

The first phase of PECS teaches the student to exchange pictures for preferred items and activities (Lerna, Esposito, Conson, Russo, & Massagli, 2012). Initial training begins with the communicative partner showing the child enticing items. The child will likely reach for an item and will be prompted to pick up the corresponding picture, reach to the communicative partner, and release the picture in the communicative partner's hand. Upon completing this sequence, the child should be immediately reinforced by receiving the requested item. It is important for the communicative partner to verbally name the item as it is given (e.g. "bubbles!"). Initial training often takes as few as 10 or 15 minutes before the child learns to independently exchange the picture and request preferred items. The second phase of PECS expands on the first phase by teaching generalization across distance, activities, settings, contexts, and communicative partners. Pictures are presented in numerous places (i.e. not only in front of the child) to eliminate the prompt cues and encourage spontaneous communication. A communication binder is often created at this time to aide in organization (Bondy & Frost, 2001).

The third phase teaches students to discriminate between preferred and non-preferred items (Lerna et al., 2012). This phase begins by presenting the child with a choice between two pictures and demonstrating that choosing a particular picture results in a specific consequence. This should be exaggerated by using a highly desired item and a non-desired item. Error correction procedures and correspondence checks should be utilized to ensure that the student is accurately discriminating between items. Training should continue by increasing the number of pictures until the child can discriminate between five or six pictures, ideally presented on the front of the communication binder to encourage binder use. During the fourth phase, the child is taught to make requests and communicate using complete sentences. This phase begins by

teaching how to build a simple sentence, such as "I want cookie," attaching the corresponding

pictures to a sentence strip, and exchanging the entire sentence strip. This skill is likely to be

learned quickly, especially if backward chaining is utilized. After this, students are taught to

make comments using sentence starters, such as "I see" or "It is." New vocabulary should not be

introduced until the fourth phase is mastered (Bondy & Frost, 2001).

The fifth phase involves instruction in answering direct questions. Starting with the

question "what do you want?" is often helpful, keeping in mind that spontaneous requesting

skills should still be reinforced. The lesson is taught using a delayed prompting procedure in

which the question is paired with a helping prompt. For example, the communicative partner

may ask "what do you want?" and then gesture toward the "I want" picture. The prompt should

be slowly faded to encourage an independent response from the student. The sixth and final

phase teaches children to make a variety of comments. New sentence starters, such as "I see," are

added during this phase and taught similarly to previous procedures. It is important during this

phase to replicate situations in which typically developing children are likely to make

spontaneous comments. Over time, questions such as "what do you see?" can be faded and the

environment itself can elicit the comment (Bondy & Frost, 2001).

Ganz and colleagues (2014) conducted a meta-analysis and found PECS to be a

particularly effective communication system for individuals with ASD and comorbid ID. In fact,

PECS was determined to be more effective for this population in comparison to individuals with

ASD alone. Perhaps a reliance on concrete versus abstract communication is useful when

working with individuals with comorbid ID. Nonetheless, PECS was also found to have at least

moderate effects for persons with a sole diagnosis of ASD. In terms of age, PECS was found to

have the largest effect for preschoolers over any other age group, emphasizing the importance of

early intervention; however, regardless of age or diagnosis, there is no evidence to suggest that

PECS inhibits speech production, ultimately making PECS the key to enhanced communicative

growth for many (Ganz et al., 2014).

<p style="text-align:center">Speech-Generating Devices (SGDs)</p>

SGDs produce pre-recorded or computer-generated speech upon the user's command.

Dedicated SGDs are devices used solely for the purposes of communication and typically have

specialized software and hardware. These devices can be described in two separate categories:

(1) static-display devices and (2) dynamic-display devices. Static display devices are commonly

customized via paper overlays that correspond to programmed language at various levels. A

popular dedicated, static-display SGD is the Attainment Company, Inc. *GoTalk* (see Appendix

A) device. In contrast, dynamic display devices present language selections via a touch screen.

When a selection is made, a message is communicated and/or a new array of choices appears.

Tobii *DynaVox* devices are among the most frequently used dedicated, dynamic-display SGDs

(see Appendix B for example). Both types of dedicated SGDs typically require specialized

software, such as *Boardmaker* sold by Mayer-Johnson, in order to create customizable text and

pictures.

Today, numerous dedicated SGDs have considerable expansion capability and can

sometimes incorporate multimedia content. These devices also offer the communicator the

option of using text or symbols. Despite these noted advances, dedicated SGDs are often

expensive, cumbersome, and time-consuming to program and personalize. In some cases, the

device may even stigmatize the user. Unfortunately, the above-listed barriers may discourage the communicator from using the system on a regular basis (Shane et al., 2012).

More recently, AAC apps have been created and offer a unique and accessible option for users given the availability of portable hardware devices, such as the *Apple iPad* or *Samsung Galaxy Tab.* This option is appealing for notable reasons: tablets and portable devices are small, easy to transport, low cost, readily available, and socially acceptable. Moreover, while the device may function as a dedicated SGD for many when the app is running, this option gives communicators the ability to use the device in numerous different ways (e.g. surfing the internet, reading books, playing games). Finally, and most notably, apps are obtainable, more affordable, easily customizable, and user-friendly (Shane et al., 2012).

A popular AAC app is *Proloquo2go* (see Appendix C) designed by AssistiveWare. The app is available for all iOS device users. According to the product description on the Apple website (Apple, 2016), *Proloquo2go* provides a voice to over 150,000 individuals, offering up to 12,000 pre-categorized words in both English and Spanish. The user is able to customize symbols, create and move buttons, modify appearance (e.g. color, font, border), and adjust spacing. The app also offers over 45 free voice options (Apple, 2016). Although the app includes many stunning features, a common complaint is that the app functions as a dedicated SGD. In other words, the app cannot be accessed on multiple devices and is only able to be used solely on the purchasing device. This is particularly problematic for a couple of reasons. First, if a parent, speech-language pathologist, or other communicative partner needs to customize a feature on the app, the user is left without a voice for this period of time. The nature of the dedicated app is also troublesome if a device is ever broken. If a device breaks, it forces a consumer/family to re-

purchase a new device as well as the *Proloquo2go* app, and, most unfortunately, leaves the user without a voice for a substantial period of time.

Recognizing the limitations of presently available AAC apps, several developers sought out to create a cloud-based AAC app that would be accessible not only across platforms, such as Apple and Android, but also across multiple devices. This inspiration gave birth to one of the newest and increasingly popular AAC apps – *CoughDrop* (see Appendix D). According to the *CoughDrop* website, the app is designed to run on all major devices, including desktop computers, laptops, iPads, iPhones, and Android tablets and phones. The user and communicative partners are able to access the app simultaneously, and devices can be swapped out with minimal interruption and confusion. The app is accessible offline when Wi-Fi or network connection is unavailable, making it easy to travel and use the device in diverse locations. *CoughDrop* also allows therapists, specialists, parents, and other team members to modify communication sets for users and access data about time of use, location of finger touch, and used vocabulary. All of this data can be exported into useful reports that can aide in decision-making about communication goals and progress. The app is also highly customizable and offers many pre-made communication sets/boards for free. Finally, the app is available for purchase either monthly or long-term (5 years), offering accessible and affordable options for consumers and families (CoughDrop, n.d.).

When deciding which SGD or app is appropriate for a communicator, it is important to keep the following in mind: the device should be kept in an accessible location; the device should be regularly charged; use of the device should be modeled and consistently used; the settings of the device should be customized for the communicator; and the device should be

treated like a true voice. Regardless of which SGD consumers may choose, it is clear that the

option of AAC offers exciting possibilities for many communicators.

A recent meta-analysis conducted by Ganz and colleagues (2014) found that SGDs

appear to produce the largest effects for individuals with ASD who do not have a comorbid

diagnosis of ID, although those persons with ASD and ID still are likely to achieve at least

moderate effects when using SGDs. Similar to PECS, SGDs were found to be most effective for

preschoolers, again highlighting the importance of early intervention. Still SGDs were found to

be at least moderately effective for older age groups (elementary and secondary). SGDs were

also found not to harm or impede speech development (Ganz et al., 2014). Given the noted

benefits of both unaided and aided AAC systems, it appears that user learning characteristics and

preference may be two of the most important considerations when deciding which AAC system

to use.

<div align="center">Functional Communication Training (FCT)</div>

Functional Communication Training (FCT) is one of the most commonly used

interventions for problem behavior displayed by individuals with developmental and intellectual

disabilities. FCT not only meets, but also far exceeds, the criteria for empirically supported

treatments outlined by the American Psychological Association, making it a well-established,

evidenced-based intervention (Rooker, Jessel, Kurtz, & Hagopian, 2013). Specifically, FCT "is a

function-based differential reinforcement procedure that involves teaching the individual to use

an appropriate communication response to access the reinforcer responsible for maintaining the

problem behavior" (Kurtz, Boelter, Jarmolowicz, Chin, & Hagopian, 2011, p. 2935). FCT

involves the following: (a) identification of the reinforcer that maintains destructive behavior via

functional assessment (e.g. functional analysis), (b) selection of a communication response based on individual skills and prescribed augmentative communication systems, (c) delivery of the above-determined reinforcer contingent on an appropriate communicative response or command, (d) differential reinforcement (for communication) and placement of the destructive behavior on extinction, and finally, (e) in some cases, provision of punishment for destructive behavior (Falcomata, Wacker, Ringdahl, Vinquist, & Dutt, 2013; Kurtz et al., 2011). Research has shown that FCT without an extinction component is largely ineffective (Rooker et al., 2013). In comparison, FCT with extinction is effective in a little more than half of all applications. When FCT with extinction is ineffective, or fails during scheduled thinning, an added punishment component has been found to be effective in 90% of applications. Recent research further suggests that FCT with extinction and some combination of punishment and alternative reinforcement (i.e. reinforcing another appropriate response, such as compliance) is highly effective, resulting in at least an 80% reduction in 86% of applications. Alternative reinforcement appears to also benefit schedule-thinning procedures, resulting in maintenance of low levels of problem behavior during thinning (Rooker et al., 2013).

FCT is an effective, evidenced-based treatment for communication and behavior challenges, particularly so for those with ASD. Children and adolescents with ASD benefit greatly from this systematic approach as it not only reduces problem behavior, but also teaches an appropriate and effective communication response. Consideration of cultural factors and involvement of multiple, interdisciplinary professionals are crucial to the success of a FCT program. Creative teaching strategies, such as video modeling and social stories, may also need to be considered to aid in the success of the intervention (Battaglia 2015).

Facilitated Communication (FC)

Facilitated Communication (FC) was brought to the United States in 1989 by Biklen who

claimed that the intervention produced unexpected literacy and communicative speech from an

otherwise "wordless person" (American Academy of Pediatrics, 1998). The intervention quickly

became popular, but by the mid-1990s, FC was generally discredited as a method of

communication. According to Saloviita, Leppänen, and Ojalammi (2014), FC consists of a

facilitator supporting the hand or arm of a person with a disability and assisting them in pointing

to letters on a keyboard or communication device. Countless research studies and reviews found

no empirical support for the claim that text produced using FC truly came from the client. In

fact, many studies suggested that the facilitator, not the individual with a disability and complex

communication needs, was responsible for the communication produced. Tests of authorship

were conducted by controlling access to the information that is given to the client. In other

words, screens are used that prevent the facilitator from seeing the object that is shown to the

client. Studies dating back to the early 1990s demonstrated that the client-facilitator pair wrote

the name of the item correctly only when the facilitator was shown the name of the item. The

pair never typed the name correctly when different pictures were presented to both the facilitator

and the client. Numerous studies demonstrated these results, ultimately suggesting that FC was

successful only when the facilitator had access to the same information as the client (Saloviita,

Leppänen, & Ojalammi, 2014).

A Frontline special, *Prisoners of Silence* (Palfreman, 1993), depicts the results of the

above-listed research studies. Moreover, the special discusses the especially disturbing findings

of un-substantiated claims of sexual abuse that were made through FC (Palfreman, 1993). Most

unfortunately, FC has restricted, and even impaired, the communication of many capable

individuals who in some instances were able to independently communicate through writing

(Saloviita, Leppänen, & Ojalammi, 2014). The National Standards Project (NSP) – Phase 2,

published by the National Autism Center (NAC; 2015), lists FC as an un-established intervention

for individuals under the age of 22. The project describes un-established interventions as those

with little to no scientific evidence to support their effectiveness. Moreover, the NSP cautions

that there is no reason to assume the effectiveness of un-established interventions and that there

is no way to rule out the possibility of the intervention causing harm (NAC, 2015). Overall, it is

clear that FC is an ineffective and harmful intervention that should not be implemented.

<div style="text-align:center">Case Study</div>

Van der Meer and colleagues (2013) conducted a study of AAC preference and ease of

use with two, school-aged children with ASD and comorbid ID – Hannah and Ian (pseudonyms).

Both children met the following inclusion criteria: (1) limited to no communication skills as

measured by an age equivalency of 2.5 years or less on the Vineland Adaptive Behavior Scales –

Second Edition (Vineland-II) expressive communication subdomain, (2) no visual or auditory

impairments that would impede use of AAC, and (3) sufficient motor skills to operate the three

AAC options as measured by the Vineland-II fine motor skills subdomain. Intervention sessions

for Hannah took place at school in a special education classroom with the first author of the

study, while sessions for Ian took place at home with his mother (who was trained and monitored

by the first author following rigorous standards). Both Ian and Hannah learned to use an *Apple*

iPod/iPad with *Proloquo2go* as a SGD. The picture exchange (PE) system consisted of 15

laminated symbols (the same symbols on the SGD). The children were also taught manual signs

from the Makaton Sign Language System. Only 13 manual signs were taught because the signs

for hello/goodbye and please/thank you are the same. Sign approximations were honored (van

der Meer et al., 2013).

The target behavior for both children was independent use of the AAC system/device for

making two- and three-step requests for specific, preferred foods and toys, which were

determined by a systematic preference assessment. An alternating treatments design was used in

the following four phases: baseline, intervention, preference assessment, and follow-up. Both

participants had varying baselines, and intervention started for Ian first, then Hannah.

Specifically, intervention sessions were conducted in a discrete trial format for 2-5 days per

week. Sessions were implemented until participants reached 79% or better across three

consecutive sessions for each AAC option. If the participant failed to meet these criteria, ten

consecutive sessions were implemented. Only one AAC option was being taught at a time and all

AAC options were counterbalanced across sessions (van der Meer et al., 2013).

During intervention, Ian learned each AAC system with comparable ease and speed. Ian

also reached criterion for each AAC system and maintained correct use at high levels. In

comparison, Hannah demonstrated slower acquisition and did not reach criterion for any AAC

system. During baseline, Ian showed preference for the SGD, while Hannah showed preference

for the PE system. Both children's preferences stayed consistent despite the introduction of new

communication systems, highlighting the importance of assessing communicator preference in

order to avoid device or system abandonment; however, it must be noted that preference did not

necessarily correspond to system proficiency (van der Meer et al., 2013).

Ian learned the iPod-based SGD at a much slower rate, but showed consistent preference

for this AAC option. Ian also appeared to respond more favorably at follow-up with the

introduction of an iPad as a SGD. Previous studies suggest that larger screen/icon size is often

beneficial, which was demonstrated in Ian's case. Hannah, on the other hand, showed preference

for, and greater progress with, the PE system (see Figures 1 and 2 below for a graphical

representation of the results; van der Meer et al., 2013).
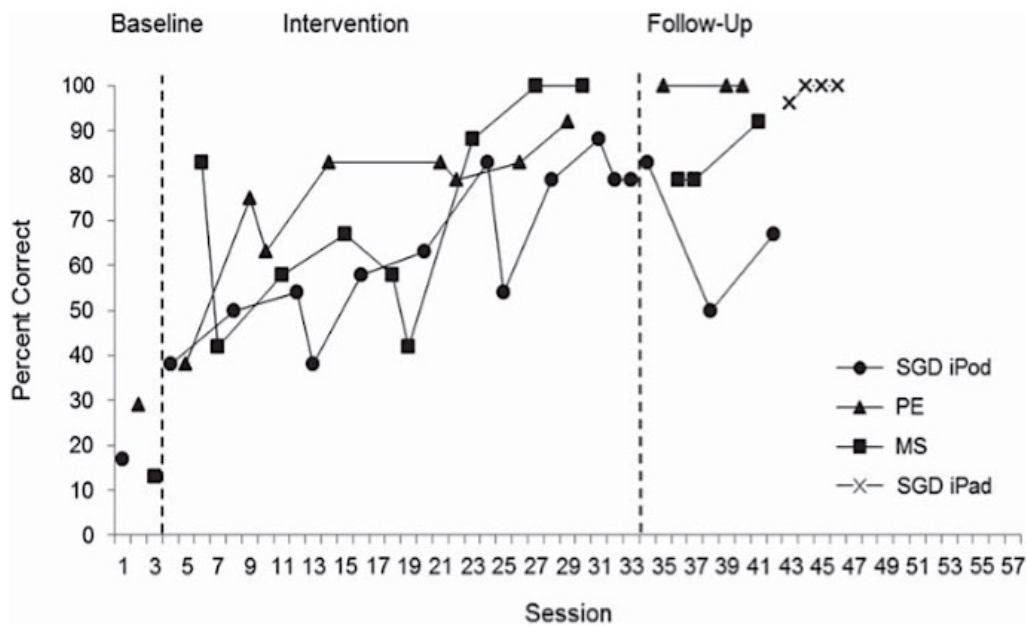
Figure 1. Percentage of correct communicative responses for each AAC option (SGD iPod, SGD iPad, PE, and MS) across sessions for Ian.
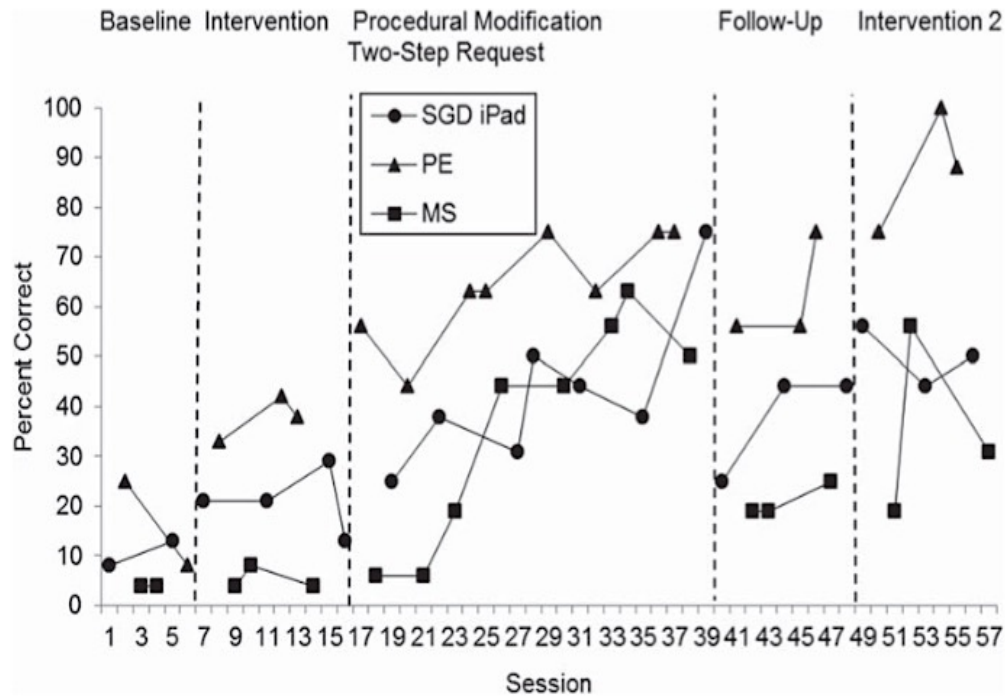
Figure 2. Percentage of correct communicative responses for each AAC option (SGD iPad, PE, and MS) across sessions for Hannah.

Results from the study conducted by van deer Meer and colleagues (2013) further

suggests that both participants were more likely to request preferred items, rather than engage in

greetings and social etiquette responses, which is consistent with characteristics of diagnoses.

Impact of AAC on Speech

While there is no shortage of AAC options available to individuals with ASD, some are

still hesitant to use systems and devices due to fear of hindering speech. Research strongly

indicates that AAC interventions do not hinder speech production. A small number of

individuals may show minimal improvement as a result of AAC intervention, but declines in

speech have not been observed. Some level of pre-treatment imitation skills and functional

speech are two identified predictors of subsequent speech production. Still, for children who

begin with little to no functional speech, small to moderate effects are often observed (Schlosser

& Wendt, 2008; Ganz et al., 2014). In short, AAC should not be considered a last resort method,

particularly given the likelihood of improved communication skills.

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Appendix A: *GoTalk* by Attainment Company, Inc.

Appendix B: *DynaVox Xpress* by Tobii DynaVox

Appendix C: *Proloquo2go* by AssistiveWare

Appendix D: *CoughDrop*

I	be	do	like	not	how	about me
it	can	have	want	to	what	personal care
pronouns	verbs	describe	short words	phrases	questions	playground
people	time	places	things	body and clothing	food	birthday