Upfront

Leo Kanner, a doctor at the Johns Hopkins Medical School, first described the characteristics of "Early Infantile Autism" in 1943.[1] One year later, Hans Asperger, an Austrian physician, wrote about children he described as having "autistic psychopathy." [2] Today, the variety of symptoms and behaviors these men initially documented constitute autistic disorder and Asperger's syndrome, two of the disorders under the umbrella of autism spectrum disorders (ASD).

ASD refers to a broad category under the clinical heading of pervasive developmental disorders (PDD) and includes autistic disorder, Rett syndrome, childhood disintegrative disorder, Asperger syndrome and pervasive developmental disorder, not otherwise specified (PDD, NOS).[3] With the exception of Rett syndrome, all other conditions classified as ASD occur more frequently in males than in females.[4]

Inasmuch as communication problems are a defining feature of ASD, increased interactions with the social environment are often used as a benchmark against which to measure the success of treatment outcomes.[5] This issue of *Augmentative Communication News* represents an effort to clarify the rationale for, and impact of, using a broad range of AAC strategies to improve the communication outcomes of individuals with ASD.

The **Clinical News** section briefly reviews current information about ASD. **For Consumers** answers frequently asked questions (FAQs) about the use of AAC in the treatment of ASD. The **Equipment** section provides specific examples of using AAC approaches to support language expression, language comprehension and the regulation of emotional responses and problem behaviors in individuals with ASD. **Case Examples** introduces two individuals and describes how AAC approaches have helped them to communicate more effectively. This issue also announces another five years of NIDRR funding of the **AAC-RERC** and describes an

Clinical News

Overview and update

Although individuals with autism spectrum disorders (ASD) may vary greatly from one another, they all face significant challenges in social communication across the lifespan. These challenges, which are at the very core of ASD, place these individuals at risk for establishing successful personal relationships and for participating in meaningful ways in school, work and community settings.

These disorders are typically present from birth. Their patterns of deficits and strengths are well described,[3] but the symptoms do vary over time and within a given individual as a result of maturation, development and intervention. Symptoms differ with regard to severity and presence of accompanying features such as mental retardation, specific language delay, sensory/motor deficits, epilepsy and behavior problems. We now know that early intervention improves outcomes, and that experienced professionals can reliably diagnose ASD in children as young as two years of age.[6]

ASD knows no racial, ethnic or social boundaries. Family income, lifestyle and educational levels do not appear to affect the likelihood that ASD will occur.[7] While the

causes of ASD are still unknown, researchers have developed a more complete understanding of the associated behavioral, genetic and neurobiological factors.[8]

Prevalence of ASD

Prevalence refers to the number of people at a point in time (or over a period of time) that have a particular identified condition. It is usually expressed as the number of people per 10,000 of the general population.

[Note: Incidence refers to the number of people who are newly identified or have acquired a condition over a specified period of time, generally one year.]

Why does prevalence matter? Prevalence data are important for families, researchers, clinicians, teachers, administrators, funders and policymakers, as well as personnel preparation and continuing education programs. Health-care and education systems must allocate sufficient human and fiscal resources to address the needs of individuals with specific types of disorders across the lifespan. Thus, when prevalence increases, additional resources are needed and must be planned for.

The prevalence of ASD worldwide is not clear; however, the reported number of cases of autism is on the rise. For example, in the 1970s, the prevalence was said to be at about 2-5 per 10,000.[4] In 1999, Fombonne reviewed more than 20 epidemiological studies published since 1987 in more than ten countries. His results suggested an autism rate of 7.5 per 10,000. Additionally he found 12.5 per 10,000 for individuals with atypical autism/pervasive developmental disorder and an overall ASD rate of 20 per 10,000.[4] More recently, Fombonne reported an overall ASD prevalence of 60 per 10,000.[9] The Centers for Disease Control (CDC) Brick Township study indicated a prevalence of ASD at 67 per 10,000 persons.[10] Reviews of evidence from other nations have shown similar increases.[7,10]

Interpreting prevalence data. In a recent article, Jacobsen said:

Until there is a "gold standard," either a biological marker or rating scale, professionals and families should exercise caution when interpreting the accuracy of prevalence rates.[11]

Several factors may account for the apparent variability over time and the supposed increase in the prevalence of ASD worldwide. For one thing, current and historical estimates of prevalence have used very different methods to identify children and relied on varying diagnostic criteria.[12] In addition, public policy changes have almost certainly increased the identification and reporting of individuals with ASD. For example, the U.S. Congress recognized ASD as a specific handicapping condition in 1990 with the reauthorization of the Individuals with Disabilities Education Act (IDEA). Since then, some states have reported dramatic increases in the numbers of children identified with ASD who are now served in educational programs.[13]

Some have also suggested that environmental circumstances, such as childhood inoculations, may account for the increased prevalence rates. However, these claims have not been substantiated by research.[14]

To summarize, historical changes in the definition of ASD, as well as in the value of an ASD diagnosis, have made it impossible to use prevalence data to determine whether the prevalence of ASD has actually increased. In any case, more individuals with ASD are actively seeking, and expecting to find, ASD intervention services.

The National Research Council

In 2001, the National Research Council (NRC) published *Educating Children with Autism.*[15] This report, prepared by the Committee on Educational Interventions for Children with Autism at the request

RERC project that focuses on the use of computer technologies with children on the autism spectrum.

I extend my deep gratitude to Emily Rubin, Pat Mirenda and Howard Shane for their assistance, expertise, insights and good humor in helping to prepare this issue of *ACN*. Special thanks to Emily Rubin for sharing so many creative examples of visual supports.

ASHA CEUs for 2003. If you registered for 2003 ASHA CEUs, you should receive the *ACN* 2003 Quiz, Instructions and Participant Form <u>WITH</u> this issue.

All CEUs quizes and accompanying forms **must be postmarked (or emailed) on or before January 15, 2004.** You may request an email copy of the quiz and forms from me at **sarahblack@aol.com.**

Have a wonderful holiday season!

Sarah W. Blackstone, Ph.D.

[Note: Two other issues of *Augmentative Communication News* have focused on autism. A 1988 issue contained general information; a 1993 issue addressed Facilitated Communication.]

Table I. Examples of NRC Panel's Conclusions and Recommendations[16]

Example of Conclusions	Recommendations for Programming
1. Children with ASD who are diagnosed and enrolled in educational programs at very early ages are more likely to have positive long-term outcomes.	The U.S. Department of Education's Office of Special Education Programs (OSEP) and the National Institutes of Health should promote routine early testing for ASD.
2. Comprehensive educational programs in school, home and community settings are the primary form of treatment for ASD.	When children are diagnosed with ASD, they should receive intensive, systematic intervention delivered by highly trained staff and tailored to the strengths of each child and family. Reevaluations should occur regularly.
3. Characteristics of appropriate intervention for a given individual must be tied to that person's and family's needs. Effective services will and should vary across children depending on age, cognitive and language levels, behavioral needs and family priorities.	Children with ASD should receive a minimum of 5 hours a day (school day), or 25 hours a week, 12 months per year of educational services, during which the child should be engaged in systematically planned, developmentally appropriate educational activities aimed at accomplishing identified objectives.
4. Parents' concerns and perspectives should actively shape educational planning.	In addition to getting written feedback, parents should be encouraged to participate in parent training/educational programs and mental health services.
5. Existing programs for children with ASD share similar features. However, the curricula across programs vary in how they prioritize goals. These differences often affect the time spent on verbal and nonverbal communication and on social activities, and they have an impact on the degree of emphasis placed on programming across behavioral, academic, motor and other domains.	Intervention programs for children with ASD should have six priorities: (1) Functional, spontaneous communication should be a primary focus. Techniques should include verbal language and alternative modes (drawn from empirical and theoretical literature) across settings; (2) Social instruction should be delivered throughout the day; (3) Play skills should be taught with a focus on play with peers and appropriate use of toys and other materials; (4) Goals aimed at cognitive development should be taught in contexts wherein skills will be used; (5) Treat-ments for problem behaviors should be systematic, positive, proactive and use techniques that have empirical support; (6) Functional academic skills taught should be appropriate to the skills and needs of each child.

of the U.S. Department of Education Office of Special Education Programs, represents the careful work of a multidisciplinary panel of experts from ten universities and the National Institutes of Health. The report addresses seven areas: (1) diagnosis, assessment and prevalence; (2) the role of families; (3) goals for educational services; (4) characteristics of effective interventions; (5) public policies; (6) personnel preparation and (7) unmet research needs. Table I shows examples of the report's conclusions and recommendations for programming, including specific treatment guidelines.[16]

[Note: Information in the NRC report is cited extensively in this issue. It has significantly contributed to an understanding of the nature of ASD, its core social and communicative challenges and the efficacy of various educational approaches used in treatment, including AAC.]

Core challenges

The constellation of behaviors that define ASD include impairments in (1) social interaction, (2) verbal and nonverbal communication and (3) restricted, repetitive and stereotyped patterns of behavior, interests and activities.[3] At the very core of the disability, however, are the social communication challenges that compromise the ability to successfully engage in conversation and to develop emotionally satisfying relationships throughout the lifespan.

There are two primary communication challenges that influence the social communication outcomes of children with ASD. The first of these relates to difficulties with joint attention, i.e., coordinating attention between people and objects. This manifests in problems with shared attention, engaging in social interac-

tions and sharing emotional states and affect. The second core challenge relates to problems with understanding and using symbols. This affects an individual's ability to understand and use language and other conventional symbols (gestures, facial expressions, etc.), to engage in symbolic play and to communicate effectively across multiple environments using symbols.[5] In addition, it is estimated that one-third to one-half of children and adults with autism do not use speech functionally.[15,17] Thus, speech as a symbolic mode is often compromised.

Challenges in both joint attention and symbol use will have an impact on an individual's acquisition of language and communication skills, and also can further exacerbate an individual's ability to cope with the demands of multiple social settings and to express and regulate emotional states. As a result, individuals with ASD often develop problematic behaviors. Thus, effectively addressing the core challenges of individuals with ASD can have a positive influence not only on speech, language and communication behaviors, but also on emotional regulation and challenging behaviors.[18]

Learning style differences

While all individuals have distinct learning styles, similarities among the learning characteristics of individuals with ASD are striking. Table II, on page 4, briefly summarizes the major learning style differences of individuals with ASD and suggests why AAC approaches are helpful. For example, individuals with ASD have:

1. **Strong preferences for static information**. Speech is transient, as are many other aspects of a conversation,

e.g., inflection, gestures. Many AAC approaches use visual symbols which are static and can help mediate these difficulties. Learning style accommodations that are (1) static, (2) transferable across contexts and (3) capitalize upon strengths in rote, associative memory are likely to be effective.

2. **Context specific learning styles**. Because individuals with ASD have strengths in episodic memory or rote, associative memory, they tend to rely on contextual cues and become dependent on specific prompts. AAC strategies enable individuals to be more independent and to learn, understand and use language. This can result in the use of more appropriate social behaviors across settings and partners.

3. **Gestaldt style of language acquisition.** A gestaldt style of language acquisition means children learn language chunks (*e.g.*, phrases, sentences), but may have a limited understanding of the components of language (*e.g.*, meaning of single words, grammar and pragmatics). Visual supports can help illustrate linguistic units and sequences.

The case for AAC

AAC approaches can help individuals with complex communication needs develop functional communication skills and become more competent communicators over time.

[Note: AAC refers to the therapeutic use of multi-modal techniques, strategies, aids and devices to augment speech. AAC is not synonymous with the use of speech generating devices (SGDs), graphic symbols, manual signs or specific therapeutic or instructional approaches (*e.g.*, Aided Language Stimulation,[19] Augmented Input,[20] the Picture Exchange Communication System,[21] Social Stories[22]). Rather, AAC is an umbrella term, including, but not limited to, all of the above approaches to treatment.]

Table II. Learning Style Differences and Implications for Using AAC with Persons with ASD (Emily Rubin, 2003)	
Learning Style Characteristics	**Implications for Using AAC Approaches**
1. **Strong preferences for nontransient information.** Individuals with ASD seem to process and use information that remains static or "fixed-in-place" over time (*e.g.*, objects, visual-spatial patterns, pictures and written words/text) more effectively than information that is transient.[25]	By capitalizing upon learning style preferences for static visual information, AAC approaches help address difficulties processing information that is transient or more "fleeting" in nature (*e.g.,* the spoken word and nonverbal social cues). Pictures or text also can support language formulation and language comprehension. and can help people derive meaning from social cues.[26,27]
2. **Context-specific learning styles.** Individuals with ASD may have a tendency to rely on context-specific conditions to generate language or conventional social behavior (*e.g.*, verbal cues of caregiver, contextual cues of peers, physical prompts of teacher). This may reflect preferences for static environmental cues and/or strengths in episodic memory and rote, associative memory.[24]	AAC strategies can serve as a "visual bridge" across contexts, thereby promoting generalization and spontaneity. Individuals may learn to associate specific expressive language forms with pictures or text rather than with the cues (verbal, physical or contextual) of communicative partners or the initial learning environment. Visual supports may also enable individuals to recall language and social behaviors independently, across settings and social partners.[28]
3. **Gestaldt style of language acquisition.** Individuals with ASD often demonstrate a gestalt language learning style secondary to their strengths in rote, associative memory. Many have difficulty processing language utterances and struggle to formulate novel language. Those who develop speech as a primary mode of communication may use both immediate and delayed forms of echolalia, suggesting that they process and use multiword language forms as whole units.[29]	Visual AAC supports can illustrate linguistic units within an utterance by providing a static or nontransient cue. They can also foster an individual's understanding of the components of multiword utterances and help a child transition from using echolalic language forms to using more creative and generative language. Since language is often learned through the auditory modality, 'tuning' into a specific word as it relates to a specific referent in the social environment is challenging. Written words/graphic symbols can facilitate this process by providing "static" contextual cues.[17,30]

AAC sometimes refers to visual symbols (photos, pictographs, text) and their use in mediating the core challenges of individuals with ASD and in supporting the language learning and communication processes. Table III offers a paradigm by Shane and Simmons that illustrates three primary ways AAC visual modes currently support individuals with ASD.[23]

1. **Visual organizational mode (VOM)**. Addresses the need to provide information in ways that help individuals organize information and materials.

2. **Visual instructional mode (VIM).** Assists individuals with ASD to understand spoken language by highlighting and breaking down components of language into easily discernible parts.

3. **Visual expressive mode (VEM)** modes. Uses symbols to enhance expressive communication so individuals can interact more independently across contexts and partners.

Summary

Individuals with ASD are currently using a myriad of AAC approaches to address their core communication challenges. AAC treatment offers powerful language, learning and educational intervention options that can greatly enhance the overall communicative competence of these individuals. AAC approaches are effective because they provide instructional strategies, aids, symbols and techniques that address *both* the unique learning styles of individuals with ASD *and* their communication needs.[17,24]

Table III. Use of AAC Visual Supports with Persons with ASD (Shane & Simmons, 2001)[23]	
Type of Visual Mode	**Description**
Visual Organizational Mode (VOM). Visual support for organizing information and materials.	Symbols represent activity, task, script, schedule (*e.g.*, pictures, text, symbols schedules).
Visual Instructional Mode (VIM). Visual support as a means to improve comprehension of language.	Symbols simultaneously represent speech (*e.g.*, aided language, augmented input).
Visual Expressive Mode (VEM). Visual support for expressive communication.	Symbols used for expressive communication (*e.g.*, PECS, hand-made displays, high-tech devices).

For Consumers

FAQs about AAC and ASD

When *augmentative/alternative communication (AAC)* approaches are suggested as a component of a communication intervention, parents, clinicians and teachers often raise a number of concerns. This section addresses a few commonly asked questions.

1. What does it mean to use AAC treatment approaches with children/adults with autism? There are a wide range of AAC tools, strategies and techniques. These are characterized either, as aided or unaided approaches as described below. Typically, the use of AAC means that a combination of unaided and aided or low-tech and high-tech approaches are introduced over time and across contexts.

With AAC interventions, the efficacy of treatment is measured by improvements in the person's daily communication skills (functional communication), as well as increases in the person's level of participation, quality of life and

AAC Approaches

Unaided approaches: Includes gestures, manual signs, vocalizations, facial expressions, body language.

Aided approaches: Includes both low- and high-tech approaches.
  Low-tech techniques. Nonelectronic communication boards and books, pictures/graphic symbols, written cues, schedule boards and visual learning aids, such as social stories, comic strip conversations, *etc*.
  High-tech equipment. Electronic/battery operated AAC devices (*e.g.*, digitized and synthesized speech generating devices), computers and their accessories.

overall satisfaction of all involved with the treatment process.

2. Why should clinicians introduce AAC approaches before a child begins to talk? Won't it interfere?

The short answer is there is no evidence that either unaided or aided AAC approaches inhibit speech development. Studies show that speech can develop in conjunction with manual signing and that signing does not inhibit speech.[17,24] The National Research Council's report also concluded there is no evidence that sign language interferes with the development of speech. The report noted that:

⟨ The use of sign language enhances the use of speech for some children.

⟨ Children with good verbal imitation skills demonstrate better speech production than those with poor verbal imitation skills, with or without AAC.

⟨ Children with difficulty imitating speech sounds are the best candidates for an AAC system, such as sign language, because they are likely to make poor progress in speech acquisition without AAC.[25]

With regard to the use of aided approaches, the literature is less clear. Mirenda reviewed studies of aided AAC and assistive technology across a wide range of applications, including:

(a) assessment, (b) staff/family training, (c) supports for augmented input (*e.g.,* schedules, choice boards) and input/output (*e.g.,* aided language stimulation), (d) supports for output (*e.g.,* visual-spatial symbols, the Picture Exchange Communication System (PECS), (e) functional communication training (FCT), (f) speech generating devices (SGDs) and (g) computer-aided instruction).[17]

She found no evidence that low- or high-tech AAC approaches interfered with the speech development of individuals with ASD.[26] In

addition, Schlosser and Blischak's[24] meta-analysis of the available evidence suggested that it is "plausible" that:

(a) PECS increases spontaneous natural speech.[27]

(b) Manual signing increases natural speech production to a greater extent than does PECS.[28]

(c) Computer-based instruction with synthetic speech output increases natural speech production more than computer-based instruction without speech output.[29]

In summary, although research questions remain unanswered as to the specific advantages and disadvantages of using AAC, there is preliminary evidence that both unaided and aided approaches can help children generate and receive communication more easily and can result in increases in language function and social participation. There is no evidence that AAC approaches result in delays in the acquisition of speech.[25,26]

3. Is the Picture Exchange Communication System (PECS) an AAC approach? PECS refers to a commercially available instructional program that uses graphics (often The Mayer-Johnson Picture Communication Symbols©) and a unique instructional methodology. PECS relies on visual symbols and focuses on developing functional communication/language skills. Thus, it is an AAC approach. PECS specifically supports individuals with ASD to share attention and make requests, choices and comments using language symbols. Instead of pointing to a symbol on a display like many other AAC approaches, however, the person is encouraged to give symbols to a communication partner through a series of prompting hierarchies.[21,27,28]

4. Some people advocate for using manual signs, while others suggest we use aided AAC approaches with individuals with ASD. What makes the most sense? Research does not predict which specific AAC approach or strategy will work best with which children. Even studies that report positive communication outcomes do so for only about half of the participants.[25] Thus, decisions about which strategies to use will always depend upon the needs, skills and abilities of the individual, his/her primary partners and the contexts within which communication occurs.

The NRC report pointed out that while many individuals with ASD may benefit from learning some manual signs while they are developing speech, it is very rare to find a child with autism who learns to sign fluently (in sentences) and flexibly. Also, manual signs are not typically understood across contexts and partners. As a result, the report concludes that signing is not an entry point into a complex, flexible system of communication for individuals with ASD.[25]

Perhaps because of the limited outcomes with manual signs and the documented visual strengths of many children with ASD, aided AAC approaches are receiving considerable attention. A range of aided AAC approaches are currently in use, as described in the box above.

5. Should I use high-tech devices or low-tech approaches with someone with ASD? At this time, it appears that both high- and low-tech approaches are useful; and it is up to each individual's team to determine what to use and under what circumstances.[30]

Aided AAC approaches

Aided AAC approaches can foster functional and spontaneous communication, expressive and receptive language. Examples are object exchange systems, photographs for language input and output, pictorial communication within a prompt-free instructional context, graphic symbols for language input and output, written words/text and computer programs such as Boardmaker© and Writing with Symbols© (Mayer Johnson, Inc.).

There is little research on the effectiveness of speech generating devices (SGDs) with individuals with autism. However, the NRC report concluded that SGDs may have some advantages over low-tech boards and symbol-based instructional methodologies because they can facilitate more normalized and natural interactions, while providing verbal models for speech development.[25] The NRC report cited a 1998 study in which four preschool children with autism were taught to use speech generating devices to request, make social comments and respond to questions in a contextually appropriate and spontaneous manner.[31] Mirenda[32] and Romski and Sevcik[20] have also written about the benefits of using AAC devices with indivdiuals with ASD.

It is likely, that over their lifetimes individuals on the autism spectrum will benefit from using a number of different low-tech and high-tech approaches. The best choices, however, will likely depend upon the characteristics of the individual and the contexts within which the person needs to communicate.

6. Does it make sense to use AAC with someone whose speech is echolalic? A majority of individuals with ASD who learn to use speech initially use echolalia. For example, an individual may demonstrate a tendency to immediately repeat the speech of others (immediate echolalia) or a tendency to "borrow" phrases they have heard previously (delayed echolalia). These phrases are often used as a means to make a request, to protest or to share information. In some cases, echolalia is more evident when an individual is anxious or attempting to self-regulate.[33]

Despite these various functions, echolalia also suggests difficulties with comprehension, as multiword language forms may be understood and used as single units. This pattern can compromise an individual's ability to form more *novel* combinations of words and, therefore, develop functional language. Using AAC to provide visual cues can foster understanding of the individual components of multi-word utterances and, therefore, help an individual transition from using predominantly echolalic language forms to using more creative and generative language.

Equipment

Using AAC to foster communication skills

by Emily Rubin

The following three tables provide examples of how AAC approaches can (1) foster receptive language development and support comprehension, (2) support language expression and pragmatics and (3) assist in regulating emotion and reducing problem behaviors. Each table includes unaided approaches and aided approaches, both low- and high-tech.

The tables illustrate how AAC can be used to meet a wide range of communication needs observed in children with ASD. It is important to note that competent communicators will typically use both aided and unaided communication techniques, depending upon the unique demands of a setting or a social partner.[34]

Table IV. Supporting Receptive Language (corresponds to Visual Instructional Mode on page 4)

Unaided Examples
Gestures
Facial expressions
Body language
Pantomime
Manual signs

In this photo, a speech-language pathologist uses a **gesture** to support language comprehension in a group context.

Low-tech Examples
Between-task schedules
Within-task schedules
Photographs
Pictures, graphic symbols
Color-coded picture symbols
Written language
Social stories
Comic strip conversations

Here, a speech-language pathologist is using **comic strip conversations** to foster negotiation skills in a group context.

Please visit Carol Gray's website for more information at www.thegraycenter.org

High-tech Examples
Computer-based instruction
Voice output communication aids (VOCAs) used for language input
Video-based instruction (*e.g.*, video modeling, video replay, *etc.*)

Champ is an "intelligent agent." (See **AAC-RERC** section, pages 12 - 13). This example shows a screen shot of a **computer character** teaching a language-based concept (the color blue.)

Blue

Blue Champ teaching (and embodying) a concept.

[Note: It is not yet clear whether a computer character can engage individuals with ASD in ways that support the learning of functional language and communication skills.]

Table V. Supporting Expressive Language/Pragmatics (corresponds to Visual Expressive Mode on page 4)

Unaided Examples
Gestures
Facial expressions
Body language
Pantomime
Manual signs

In addition to words, pictures and writing, Ryan, age 6, frequently uses a range of functional **signs.** In this photo, Ryan and his father are discussing whether to have a "cookie" or a "cracker" for snack.

Low-tech Examples
Between-task schedules
Within-task schedules
Photographs
Pictures, graphic symbols
Color-coded picture symbols
Written language
Social stories
Comic strip conversations

Rachel, age 6, uses **color-coded pictures, symbols and sentence templates** to create more sophisticated sentences with subjects, verbs, prepositions and noun phrases. Here she is describing a drawing she created for her kindergarten journal about recess. To create the sentence *I played in the sand,* she used a color-coded sentence template and picture symbols with color-coded borders. The Picture Communication Symbols (PCS) copyright © 1981-2003, Mayer-Johnson, Inc.

High-tech Examples
Voice output communication aids or speech generating devices
Computer software designed to foster language expression (Boardmaker, Writing with Symbols, Intellitalk, *etc.*)

This low-cost, **speech generating device** (the Talking Photo Album) can enable an individual to tell stories, engage in conversation and communicate out in the community (*e.g.*, order food in restaurants).

For more information about this digitized speech device, visit: http://shop. augcominc.com

Table VI. Supporting Emotional Regulation/Reduction of Problem Behavior

(corresponds to Visual Organizational Mode on page 4)

Unaided Examples
Gestures
Facial expressions
Body language
Pantomime
Manual signs

Using **signs and/or body language** to express both positive and negative emotions in socially appropriate ways can improve emotional regulation and reduce the incidence of problem behaviors. In this photo, an occupational therapist is helping Patrick, age 5, use gestures and facial expressions to express his emotions more clearly and effectively.

Low-tech Examples
Between-task schedules
Within-task schedules
First/then boards
Social stories
Comic strip conversations
Feelings Book
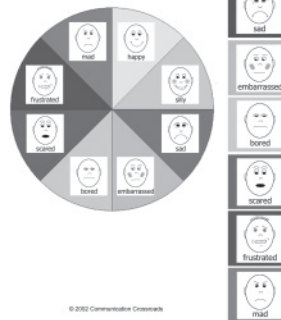
The *Feelings Book* by Rubin, Laurent and Mikrut provides a means to (1) express emotional states, (2) determine the intensity of emotions based on previous experiences and (3) select socially appropriate coping strategies.

For more information, go to
www. CommXRoads.com

High-tech Examples
Computer-based instruction
Voice output communication aids (VOCAs) used for language input
Video-based instruction (*e.g.*, video modeling, video replay, etc.).
Timers

A **visual timer** can be quite useful as a (1) "waiting" support in between activities, (2) support for turn-taking and (3) support to delineate the endpoint of more open-ended activities.

An example of a visual timer is the Time Timer, available from www. timetimer.com.

Case Examples

Individuals with ASD

The following two case examples illustrate some of the ways in which AAC supports are having a positive impact on the functional communication of people with ASD. These examples demonstrate the need to implement a comprehensive approach when designing AAC treatment for individuals with ASD. Although important, it is not enough to support an individual's expressive communication efforts. Individuals with ASD have communication issues that require treatment approaches (unaided and aided AAC) and instructional methodologies designed specifically to address their language comprehension, emotional regulation and organizational needs.

Both case examples show that when professionals provide intervention in natural contexts, the results can lead not only to improved communication skills, but also to greater participation in educational and community settings and can have positive impacts on an individual's communication partners. I am indebted to Emily Rubin and Pat Mirenda for sharing their experiences and expertise.

Using AAC to reduce problem behavior by Pat Mirenda

At the time of the intervention, Alec was a 17-year-old young man with autism who attended his neighborhood secondary school with a one-to-one support aide. While he said a few words, his speech was mostly echolalic. He could answer simple yes/no questions with a head nod or shake, and used a few generic manual signs (*e.g.*, eat, drink, please,

bathroom). Alec was well known to behavior support agencies in his community because of his severe aggressive behaviors. He was referred for a behavioral assessment to gather information about what events triggered the behaviors of concern.

A behavioral assessment was completed over several days, using the Functional Analysis Interview and the Functional Analysis Observation protocol.[35] The results showed that his aggressive behaviors constituted communicative messages related to three needs:

1. Need for predictability with regard to his daily schedule and routines. Alec's schedule of classes at school and his after-school and weekend activities was quite variable from day to day. During transitions from one activity to the next, Alec often engaged in aggressive behavior (Message: "I don't understand what's happening.").

2. Need to express preferences for food, drinks and leisure activities. Because of his limited communication skills, Alec was often unable to communicate preferences. Aggressive behaviors were observed when he wanted to ask for something but had no way to do so (Message: "I want X.").

3. Need for an appropriate way to express negative reactions. Alec's supporters would sometimes make food or activity decisions without consulting him first and, when informed of these decisions, he became aggressive (Message: "I don't want X.").

Based on the functional behavioral assessment, a behavioral support plan that included several AAC components was developed. The overall goal was to enable him to predict events and communicate his preferences using schedules and a choice system.

Intervention. Alec could discriminate two-inch square Mayer-Johnson Picture Communication Symbols.[©] Staff selected and lami-

nated several symbols that represented his routine activities (*e.g.*, get dressed, brush teeth, eat breakfast, go to school on the bus), as well as food, drink and leisure activity preferences. These symbols were organized in a binder of slide protector pages by category (*e.g.*, school activities, community activities, home activities, foods, drinks) so they could be located easily. In addition, symbols that represented required, non-negotiable activities (*e.g.*, taking his medication, attending a scheduled class at school) were marked with a large red dot in the upper left corner to signify no choice.

Alec's schedule was laid out on a blank slide protector page three times each day—before school, immediately after school and after dinner, as follows:

1. Alec and a supporter inserted symbols for the upcoming required, non-negotiable activities in left-to-right, top-to-bottom order on the schedule page.

2. Alec then was presented with two or three symbols at a time representing food, drink or activity choices and reminded verbally what each represented. He was asked to select his preference. For example, he might be given a choice of "going to the store," "going for a walk in the park" or "going swimming" as an after-school activity.

3. He was given menu choices during breakfast, lunch, snack and dinner.

Figure 1. After-school schedule and dinner menu

Alec and his support workers carried the schedule with them and used it dynamically throughout the day. Figure 1 displays an example of an after-school activity and dinner menu for Alec.

Results. After introducing Alec to the schedule and choice system, his aggressive behavior decreased from an average of 23 severe aggressive episodes per month at baseline to near-zero levels over the subsequent 21 months when data were collected. During this time, Alec finished high school, moved to a supported-living apartment and began working in a part-time supported job as a groundskeeper for the local parks department. Currently, he plays soccer on a team that includes players with and without disabilities, and enjoys working in a community garden near his home, going to the movies and hiking in the nearby mountains.

Three years after the intervention, Alec continues to use his schedule and choice system and his aggression is no longer evident. The use of AAC supports had a dramatic effect on Alec's functional communication and his quality of life, as well as on the quality of life of those providing him with support.

Using AAC to support expression, language comprehension and emotional regulation by Emily Rubin

Rachel was making a transition into an integrated kindergarten setting at the time of the intervention described below. She was 6-years-old and had been diagnosed with Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS) at an early age. She had been attending an intensive, specialized full-day preschool program through her public school district for the previous three years. Her parents and team

members indicated that she communicated through a range of gestures such as pointing, giving and reaching.

Rachel had developed a broad single word vocabulary that included functional words (*more, all done, open* and *help);* and she had begun to use brief phrases (*No thank you*) and simple sentences with greater consistency. Her sentences ranged from those that were scripted in nature (*I want tickles.*) to the occasional use of creative subjects + verbs + object phrases (1 to 3 words in length). She occasionally initiated interactions with her teachers and peers and followed simple directions within the routines of her classroom.

A team meeting was held to plan for Rachel's inclusion within a kindergarten class, to identify goals and to select specific tools for her one-on-one instructional assistant to use to support her. Rachel's team selected three target areas:[34]

1. **Expressive communication**. Rachel's spontaneous expressive communication was primarily limited to making requests, protesting, and requesting assistance (instrumental functions). She had difficulty sharing information about her experiences, particularly with her peers. Her social conversations were typically limited to topics about events within the immediate environment and usually did not extend beyond one or two exchanges. She needed a way to comment about both past and future events.

2. **Language comprehension**. The sophistication and flexibility of Rachel's spontaneous language remained compromised, secondary to difficulties with understanding spoken language. This contributed, in part, to her tendency to process orally presented language as multiword "chunks." Thus, she had difficulty responding to oral directions with multiple steps and recognizing the meanings of the individual components of an utterance.
Additionally, her processing difficulties contributed to the use of echolalia on a regular basis. She had difficulty

combining words unless she had heard the phrase before or was provided with a verbal model.

3. **Organization and emotional regulation**. Rachel's limited use of language occasionally led to increased anxiety, a higher frequency of echolalia, and prolonged periods of social disengagement (*e.g.*, tuning out, screeching and tantrums). On occasion, these episodes lasted as long as thirty minutes. These behaviors occurred most frequently in social contexts that (a) lacked a clear temporal structure (*e.g.*, a clear beginning, well-defined steps and a predictable end point), (b) involved transitioning from one activity to another, (c) were highly stimulating or (d) involved complex language use.

Rachel's education team reflected on her learning strengths and preferences to determine an educational plan. They selected several AAC supports to foster her competence in her new kindergarten classroom. She learned most efficiently when information was presented visually in a static or fixed manner. She had an emerging sight word vocabulary and could recognize graphic symbols. Therefore, her education team decided to use visual cues to foster Rachel's expressive communication, language comprehension and organization/emotional regulation in her new classroom setting.

Intervention.
1. **Expressive communication**. To enhance Rachel's expressive communication, staff provided her with visual supports to use during activities within the typical kindergarten curriculum, so that she could share information or comment. Specific vocabulary and sentence templates were prepared using colorful Boardmaker© symbols (Mayer-Johnson, Inc.) so that she could create simple sentences relevant to a given activity. Each portion of the sentence (*e.g.*, the

subject, the verb, the preposition, and the object phrase) was color-coded. Symbols denoting *subjects* were bordered in red, *verbs* were green, *prepositions* were blue and *objects* were yellow. The sentence templates indicated the targeted sequence of words with blank, color-coded symbol boxes. Two examples follow:

a. Kindergarten journal activity. Each child in Rachel's class was required to write in a journal on a daily basis. Journal entries often involved having the child draw a preferred activity and write a simple comment about the picture. Given Rachel's difficulties with commenting and creating novel combinations of words, color-coded sentence assembly templates were provided in the journal. Rachel was given several choices of subjects, verbs, prepositions and objects to select from. She then cut and pasted the symbols into the sentence templates by matching the content and colored borders. An example of Rachel describing a recess activity is provided in the **Equipment** section on page 8.

b. Early literacy and narrative activities. Storytime was a central activity during the school day. Rachel and her classmates often were asked to identify the characters in the story, what they were doing and where they were going. The team created a sentence assembly template to support Rachel's ability to respond to these questions. [Please refer to inset (page 1) for an example of her sentence assembly template.]

2. **Receptive language.** Rachel's team was concerned about the complexity of oral instructions in her integrated kindergarten classroom. Therefore, the team developed visual supports and strategies to clarify multi-step classroom activities and to heighten her comprehension of individual language concepts within oral directives (*e.g.*, action words, descriptive concepts, quantity concepts and prepositions).

For multi-step activities such as art projects, imaginative play and
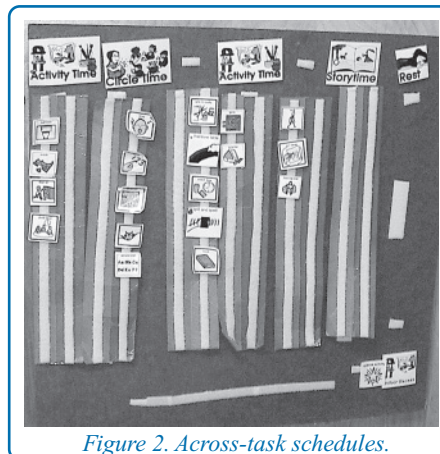
Figure 2. Across-task schedules.

cooking activities, within-task schedules were created. [See page 2 of the *ACN* insert for an example of her within-task schedule.]

3. **Organization and emotional regulation**. Enhancing Rachel's organization and emotional regulation was a high priority for her education team, as anxiety about new and changing situations could lead to prolonged periods of social disengagement. Examples are provided below:

a. Across-task schedules. Graphics were used to denote the sequence of daily activities (*i.e.*, a personal across-task schedule — *Activity Time, Circle time* and *Story Time*). These portable strips were carried to each activity. Given the complexity of Rachel's integrated classroom's schedule, these smaller and portable across-task schedules enabled her to predict specific steps, and to know the smaller tasks she needed to complete before going back to the master schedule. Figure 2 shows an example. Major activities are denoted
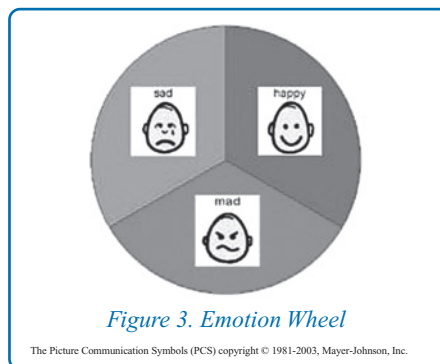
Figure 3. Emotion Wheel

from left to right at the top of the page. Smaller steps within activities are located on removable strips below the associated activity.

b. An emotion wheel. Rachel had a limited ability to express her emotions. Thus, an emotion wheel was always available to her. The emotion wheel included a simple color-coded pie chart with three slices with symbols denoting *happy*, *sad* and *mad*. [See Figure 3.] Although not shown here, Rachel could also select socially appropriate coping strategies (*e.g.*, go to the *cozy corner*, *go for a walk* and *sit in the bean bag*), which she used to "regroup" before rejoining an activity.

Results. Rachel has now entered an integrated first grade classroom following a successful year in her kindergarten class. She has made gains in expressive communication, and now comments about events in her journal. She has also increased her use of novel sentence structures. She continues to rely on sentence assembly supports during some class activities.

Rachel can now independently follow multi-step activities, using a within-task schedule board to cue her about next steps. She no longer requires verbal prompting or multiple repetitions of instructions.

Lastly, Rachel's overall organization and emotional regulation abilities have improved. At the end of kindergarten, she was making transitions across activities with minimal support from her instructional assistant, using her personalized across-task schedule board. She was also using the emotion wheel and was more apt to share her feelings (*e.g., I feel mad*). Rachel was also spontaneously requesting self-soothing activities throughout her day and typically required only five minutes to regroup.

Videotape has been used to present scenarios of individuals performing functional skills in the community, to teach conversational skills, to train novel skills and to promote generalization to unfamiliar settings.[38]

Research has shown that students with ASD[39] and students with mental retardation[40] can accurately imitate peer models and videotape models and that videotape models may be more effective than peer models.[41]

In a pilot study, Shane and Douglas compared the ability of children with ASD to follow oral directives when presented within a video clip on a computer screen, versus a live human presentation. All students showed significantly better performance when an oral directive was given by the computer figure.[42] Also, a recent study at Oregon Health and Science University demonstrated that a character known as "Baldi" (a 3-dimensional graphical model of a human head programmed to synthesize the facial movements of a talking human face) enhanced the practice of speech and language therapy techniques outside of the clinical environment. Baldi has also served as a guide, or non-human instructor, in a software application.[43] However, it is not yet clear whether an "intelligent agent" (IA) might appeal to persons with ASD or if such a "character" might foster communication.

Project description and plan. Shane has developed a prototype that uses ESM and a computer-based IA to influence behavior and to improve the communication skills of persons with ASD. Figure 4 shows a sample of an ESM research environment. Figure 5 introduces "Champ," the project's IA.

Initially, researchers will recruit 100 families and caregivers of children with a diagnosis of autism

Figure 4. Sample Kitchen Scene with Electronic Screen Media

or pervasive developmental disorder ranging in age from preschool to 12 years. These individuals will help identify which features (or patterns of features) of visual programs (both video and computer based) are most appealing to children with ASD. Researchers will then use this information to modify and adapt the current prototype.

In Phase 2 of the project, researchers will recruit a representative sample of parent/child pairs (children with autism or pervasive developmental disabity, not otherwise specified, aged 5 to 12 years) and conduct tests that measure the

effectiveness of using the modified computer-based ESM and a computer-based IA to support the communication efforts and skills development of individuals with ASD. Researchers hope that the results of this project will support the development of a commercially available Intelligent Agents in an Electronic Screen Media environment that will enable children with autism to communicate more effectively.

Figure 5. Champ, the Intelligent Agent

Resources

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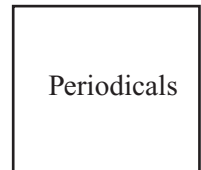
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Sentence Assembly Support

Created to Enhance an Individual's Expressive Language and Early Narrative Skills
by Emily Rubin (Emily@CommXRoads.com)

The Picture Communication Symbols (PCS) copyright © 1981-2003, Mayer-Johnson, Inc.

Instructions. This sentence assembly support was created as a low-tech aid. Its purpose is to enhance an individual's expressive language and early narrative skills. The blank sentence template at the bottom of the page provides a visual cue. The individual selects a specific character, action and location by matching pictures from the column with the appropriate colored border to form novel and descriptive sentences. In this case, the wordless picture book, The Boy, Dog, & Frog (Mercer Mayer, Permabound publishers) was augmented. The use of color-coded picture symbols, paired with the written word, can support individuals who have difficulties speaking and individuals with echolalia to more independently create *novel* language forms. **Page 1**

Within-Task Schedule

Created to Enhance an Individual's Comprehension
by Emily Rubin (Emily@CommXRoads.com)   [Thanks also to Amy Laurent, OTR]

Graham Cracker Treats

I	put	my name	on	the plate
I	put	the cracker	on	the plate
I	scoop	the frosting	on	the cracker
I	put	chocolate chips	in	the frosting
I	shake	sprinkles	on	the frosting
I	eat	the cracker		

The Picture Communication Symbols (PCS) copyright © 1981-2003, Mayer-Johnson, Inc.

Instructions: This within-task schedule was created to support comprehension during an activity—making "graham cracker treats." The green side of the schedule represents steps "to do." The red side represents steps that are "all done." Upon completion of each step, the sentence strip is moved to the "all done" side. Within-task schedules can be individualized to meet the unique needs of an individual and a given setting. For example, language targets can be simplified (*e.g.*, 1 to 3 words in length) and the number of steps can be reduced (*e.g.*, 3 to 4 steps). This within-task schedule is useful when multiple pieces of information are implied in an instruction (*e.g.*, time to make graham cracker treats) or when an activity has multiple steps.