Aggression as Communicative Behavior in Individuals with Angelman Syndrome

Introduction

Stephen Calculator, Ph.D.

I'm Stephen Calculator. I'm a Professor of Communication Sciences and Disorders at the University of New Hampshire in Durham, NH. I served as a consulting speech-language pathologist with a particular emphasis as well as an interest in individuals with Angelman Syndrome.
What I'll be speaking with you about today is indeed the relationship between communication and behavior. We're going to start things off by defining exactly what do we mean by communication. Next what we'll do is we will take a look at aggression and other challenging behaviors and look at those in terms of communicative behavior. We're going to place special emphasis on trying to understand the function of these challenging behaviors. Since speech is rarely a primary form of communication for individuals with Angelman Syndrome, we're going to explore other forms of communication. These will fit under the topic of Augmentative and Alternative Communication, or, AAC. AAC: augmentative and alternative communication.

In taking a look at AAC applications we're going to explore this from the perspective of three primary principles. We'll also be taking a look at the various components of an AAC system. The important thing to keep in mind here is we are looking beyond a particular device or particular method of communication. We are going to conclude the module by talking about a series of strategies that you can use at home and elsewhere to foster communication skills in your individual with Angelman Syndrome.

Overview of Module

Behavior and Communication

Today what we will be talking about is the relationship between behavior and communication. We will then move into a discussion of a review of communication and language skills in individuals with Angelman Syndrome. The primary thing I'd like you to take out of that is the fact that individuals with Angelman Syndrome are indeed communicating. We need to contrast however the concept of communication and language. We'll draw a distinction between these two terms and talk about their implications in terms of communication training. We'll then move to a discussion on an overview of AAC and introduce the principles of effectiveness, efficiency, and naturalness. What we'll find is that these three terms provide very, very useful parameters for developing communication programs. Next, we'll talk about the various components of an AAC system. As we'll

see there will be four basic components, all of which are definitely necessary to consider in developing and implementing a communication program. We'll then wrap things up by talking about things that you can do to foster effective communication in your individual with severe challenging behaviors, particularly aggression.

Learning Objectives

Augmentative and Alternative Communication (AAC)

Our first learning objective is to try to understand how AAC can serve as a replacement for aggressive behavior.

A second objective that we'll be targeting in this particular presentation is getting you to recognize the heterogeneous nature of communication and language skills across the population of individuals with Angelman Syndrome. It's very important to respect the fact that there are great differences in terms of the diversity of skills presented by individuals with Angelman Syndrome with implications for how we might approach those skills.

Third, we'll talk about the three aspects of AAC and try to get you to the point where you can compare and contrast these concepts of effectiveness, efficiency, and naturalness. Along those same lines we'll talk about how these principles relate to developing alternatives to aggressive behavior.

Next I'd like you to recognize and provide examples of the four basic components of an AAC system: symbols, strategies, techniques and methods or devices by which communication is conveyed.

Finally your last objective will be to be able to discuss the 14 strategies that can be used to foster individuals' uses of AAC systems in place of aggressive behaviors.

Relationship Between Behavior and Communication

Communicative Behavior in Individuals with Angelman Syndrome

Let's talk about the relationship between behavior and communication. In order to communicate there must be a speaker, a listener, and one or a series of messages that are transmitted successfully between the two. In most cases communication occurs for a reason. In other words, the speaker has a specific intention in mind or a purpose in mind when they attempt to communicate. That said, there are some situations that might arise where individuals with Angelman Syndrome engage in behaviors that are communicative even though they are not conveyed with any apparent intent.

Case Example: James

Let's for example talk about the case of James. James is in his bedroom alone and begins hitting his head. There are no demands being placed on James and no one is around to respond to him. We might say then that James is not communicating in the fact that there is no listener present. When his Mom

So, was James truly communicating in this example?

In this situation there was no indication James was hitting his head to request a bath. Instead it was his mother that assigned meaning, right or wrong, to this behavior and then acted accordingly. James got his message across with no apparent intention to do so. As such an instance of communication occurred. We see this particularly in children and adults with severe communication challenges where their behavior is indeed not yet intentional and however they then rely upon their parents and others to gloss the meaning of those utterances and respond accordingly; communication thus taking place.

Purposeful and Communicative

Are situations in which behaviors are both intentional and communicative more evident in individuals with Angelman Syndrome? It is far more common to see scenarios in which challenging behaviors are both purposeful and communicative. Going back to the previous example of hitting one's head, other children might rely on this same behavior for various reasons. For example, one child might hit their head seeking a parent's attention. Another might do so trying to avoid or escape from an undesirable task. A third individual might engage in this behavior to request an object or to request an action. If you take a look at Jane Summers' module you will find there are ways to not only identify the meaning of such behaviors but also replace them with more desirable forms of communication. I'll also be getting into some of those strategies in today's module.

Communication and Language Skills in Individuals with Angelman Syndrome

Variations in Communication Skills

First of all it is very important to recognize that although individuals with AS share many similarities with respect to their communication and language skills, there remain major variations both within and across genotypes, or, causes of AS. For example, researchers have reported individuals with AS, including those with as well as those without deletions; frequently rely on pre-linguistic and nonsymbolic forms of communication. These include behaviors such as natural gestures, pointing, facial expressions, and pulling a listener toward a desired object or activity, also known as physical manipulation. As a parent of a child with Angelman Syndrome I'm certain you've personally encountered all of these behaviors in that they are quite common both in children with as well as without deletions. Individuals may find anyone or combination of these methods are useful in meeting their daily communication needs and demands.

When these methods are insufficient, other methods of communication, including challenging behaviors, may arise. There is a study done in 2009 by Didden and colleagues that found 10-35% of 79 individuals in their sample used what they referred to as 'problem behaviors' to communicate, especially for rejecting, protesting and commenting. We can see this as direct evidence that when individuals lack effective methods of communication they indeed resort to alternative methods, in this case problem behaviors.

Case Examples: Molly, Sean and Kristin

Case Example 1: Molly

Let's look at the example of Molly. When her Aide presents a crayon and asks her to color a picture, Molly pushes her chair back from the table, indicating she doesn't wish to color. While prelinguistic and nonsymbolic, the intended meaning of this behavior is evident. Again Molly has reacted to the presence of the crayon. Intrinsically she sees this as an undesired task and has pushed the crayon away with no intention. However in this case Molly's Aide fails to interpret the behavior accurately. She does not recognize the communicative intent of Molly's behavior. Instead she persists and presents the crayon a second time. This time Molly pushes away the Aide's hand, once again communicating, 'I don't want to color.' Once again failing to acknowledge the meaning of Molly's message, the Aide presents the crayon a third time. This time Molly hits her Aide in the face and screams loudly. Her Aide responds by removing the crayon, precisely what Molly is hoping for. Molly's aggressive behavior only became necessary after failing to convey her message through other means. This is a very important distinction. Had Molly been successful by pushing the crayon away or through these other methods that led up to the challenging behavior, the challenging behavior would not have occurred.

Interesting. What might Molly have learned from this interaction? Molly may have learned something negative from this interaction. It doesn't work when I distance myself from something or I gently push it way. Maybe I need to find a more effective way of getting my point across. When I hit my partner and scream, I get the desired consequence. These behaviors are proving so effective that I'm going to continue to use them in similar situations that I might encounter further down the line.

Case Example 2: Sean

Next there is the case of Sean who gazes out the window and sees several neighborhood children playing with his brother in their backyard. Sean is upset that he is being expected to clear his dishes off the table following a snack while his brother is playing outside. Sean 'protests' by reaching for his mother's hair in an attempt to pull it. His mother redirects Sean to a communication device and Sean touches a series of keys resulting in a spoken message, "I want to go outside Mom." His mother promptly takes him outside. In this case an opportunity has been presented for Sean to learn that pulling hair is not an effective method of communication. However if he uses his communication device he is more likely to have his needs met. We can thus assume that when encountering a similar situation Sean will resort to his communication device as opposed to some type of challenging behavior such as hair pulling.

Case Example 3: Kristin

In a third example we see Kristin who grows agitated when there is too much going on around her. One day in school Trevor, a classmate, trips and falls to the floor. Kristin is annoyed by the sound of Trevor crying and reacts by scratching Noah, the child seated closest to her. Kristin is punished for this behavior by being sent to time out. She experiences a consequence to her aggressive behavior, time out, but an opportunity to teach her an alternative means of indicating the noise is upsetting her has been lost.

Case Example Commonalities

What do these three examples have in common? In all three of these cases, the children resorted to challenging behaviors to communicate their ideas and feelings. Our goal in each case would be to teach the child an alternative way of communicating the same content thus eliminating their need for the aggressive behavior. However, so long as their aggressive behaviors are successful (e.g. Molly's teacher responding by withdrawing the crayon and shifting to a different task, just what Molly wanted, individuals will continue to rely on these behaviors). Molly, Sean, and Kristin all had a specific purpose in mind before emitting their challenging behavior. They remind us that individuals with AS communicate for many different

reasons to express a variety of communicative intents.

Communicative Intent

Communicative Intent

In taking a look at the information presented here we can see individuals might communicate to reject, to protest, to make various types of requests including requests for social interaction or attention, requests for an object, requests for an action, requests for assistance, requests for clarification. They might also engage in communication for the purpose of commenting. This is just an abbreviated list of communicative intents but the important point is to indeed understand individuals communicate for a variety of reasons.

Once again, individuals communicate for many different reasons. It's important to keep in mind that aggressive behaviors might be used for any of these intents, again getting attention, requesting an object, requesting an action, etc. In developing communication programs for individuals with AS it is very important that a broad range of communicative functions or, intents are targeted. We don't want to narrow instruction to just teaching an individual to make choices. Instead we want to teach and encourage appropriate ways of conveying a full range of communicative intents.

Along these lines, when we take a look at the presence of aggressive behavior we need to ask the question, why is that behavior occurring? Is it to request attention, is it to request an action, is it to request clarification, is it to comment? Until we understand the function of that communicative behavior we are at a loss in terms of replacing it with a more appropriate communicative behavior. Before leaving this subject it's important to point out that not all individuals with AS communicate with intent. We discussed this a bit earlier in the module. Just like very young typically developing children, individuals' earliest communicative behaviors depend on partners to interpret meaning and then respond contingently. For example, Sean hasn't eaten anything off his plate for a minute or two. His father infers that Sean is finished eating and starts to remove his plate. Sean, who is actually still hungry, hits his father. Perhaps he did not hit his father with the intent of communicating protest, "I'm not done with my lunch. Give it back!" Instead the hit may have been a reaction to the situation with no actual intent communicated. Regardless of whether or not his behavior was intentional, what follows will depend on Dad's ability to correctly interpret the behavior.

Again this is a very, very important point. As the parent of a child or adult with Angelman Syndrome even if your individual is not communicating with intent it becomes very important that you are able to use the context to try to determine the reasoning behind that particular behavior. Your ability to interpret and respond to the behavior will be critical in determining whether or not an aggressive behavior occurs.

How to Determine Communicative Intent

Are there ways to determine whether or not an individual is communicating intentionally? Let's take a look at this table. What you see are criteria for determining an individual's behavior as intentional or non-intentional. There are four basic parameters presented for determining intentionality. One does the individual make eye contact with the partner while gesturing or vocalizing? And along these same lines do they alternate their gaze between the object and the partner? Sometimes we talk about this in terms of visual regard and mutual gaze. This is a behavior that is very commonly seen in individuals with Angelman Syndrome. They look directly at us. They shift their attention to the object that they wish to

obtain or they wish us to act upon and they shift back and forth between ourselves and the object.

A second way of indicating whether or not an individual's behavior is being intentional or not is to take a look at the gestures and vocalizations having become consistent and ritualized. In other words they use the same behavior time after time. For example, rather than reaching for a toy the individual uses a gesture of opening and closing her hand. We see this behavior exhibited each time the individual wants that particular toy. Third, following the gesture or vocalization the individual pauses to wait for a response. It's as if they are anticipating some type of response or some type of outcome from us. Fourth, the individual may persist in attempting to communicate if he or she is not understood and sometimes even modifies the behavior. We all know how persistent individuals with Angelman Syndrome can be. The idea is if an additional behavior is not indeed effective or communicative, the individual persists. So let's really underscore the importance of these four features and let's recognize the fact that if we want to teach intentionality to an individual with AS these are four behaviors we are going to want to reinforce. It's only by the individual observing that these behaviors are effective that we can establish true intentionality of communication.

What might we do when aggressive behaviors are not intentional and we want an individual to use a more socially appropriate behavior intentionally? If unintentional, in other words the behaviors are a reaction to a situation as opposed to a conscious effort to change it, we might find it helpful to structure situations in such a way that individuals can discover their uses of a specific appropriate behavior in a particular context can have a particular effect and generate a desired result. Behaviors can thus transition from unintentional to intentional. Conversely, if the individual is already communicating intentionally, albeit inappropriately - for example through aggressive behaviors, our goal might be to replace such behaviors with more appropriate alternatives.

The Difference Between Communication and Language

Language: Expressive and Receptive

So far we've been talking about communication. What's the difference between communication and language, or is there one? Investigations of the language of individuals with Angelman Syndrome have consistently identified severe limitations both in terms of expressive language as well as receptive language. We can think of expressive language in terms of production - the use of language; spoken output or any other form of output, as opposed to receptive language-that relates more in terms of comprehension, or, understanding of language. As a parent of an individual with Angelman Syndrome you probably have something in common with many other parents in that you would report your observation that your individual understands far more than they are able to express. This is indeed very very common in individuals with Angelman Syndrome. However these reports are not always supported by research findings. While some, but not all, investigators have found individuals' abilities to comprehend exceed their ability to express, again this has now always been found to be the case. In many situations individuals are found to demonstrate difficulties not only with expressive but as well receptive language. We'll take these into consideration later in the module when we talk about ways that you can foster communication skills in your individual with Angelman Syndrome.

Genotype and Communicative Behavior

Deletion Positive vs. Deletion Negative

Does it make a difference if the individual is deletion positive or deletion negative? Apparently so. It's also been found that individuals with deletions generally exhibit more severe language disabilities than those diagnosed deletion negative. Regardless of the cause of Angelman Syndrome however, individuals' strong interest in social interactions is typically cited among their greatest strengths. This is something we're always going to want to build upon. Later we will discuss ways in which you can compensate the individuals' language disabilities and structure interactions in ways that foster individuals' communicative success. When individuals associate their uses of appropriate forms of communication with communicative success their needs to rely on alternative methods, such as aggressive behaviors, may indeed diminish.

Something I do want to emphasize in talking about language in individuals with Angelman Syndrome is the fact that there is tremendous heterogeneity within this population. So we can take a look at a population, for example individuals that are deletion positive and we can identify situations in which some individuals are communicating with a single symbol whereas others are chaining and linking symbols together to comprise phrases and even sentences and even discourse.

Given individuals with Angelman Syndrome cannot use speech as a primary method of communication; it would seem they would benefit from other forms of communication.

How Do I Know if an Individual is a Candidate for AAC?

We've talked about the need to replace challenging behaviors with alternative methods of communication. This leads us to a discussion of Augmentative and Alternative Communication or, AAC. Lack or absence of speech is always cited as one of the defining characteristics of Angelman Syndrome. It's thus no wonder that ALL individuals with AS are candidates for one or more methods of AAC.

Zero Exclusion!

A Zero Exclusion Policy

All individuals are candidates for AAC. This is a very important point. We refer to this as a zero exclusion policy. As such there are no pre-requisites for the use of AAC. Any individual who is unable to use speech as a primary method of communication is a candidate for AAC.

In my consulting work I've seen this proposition violated on many occasions. For example, there are some individuals that are being taught cause-effect or means-end behavior. The idea is they have to establish these cognitive pre-requisites before they can be deemed candidates for AAC. This is not consistent with good practice much less best practice.

Individuals with AS

Again, all individuals with AS communicate - all individuals failing to use speech as a primary method of communication are candidates then for AAC.

Differences Between Augmentative and Alternative Communication Systems

Augmenting Existing Behavior

As the name implies, AAC refers to two possible applications: augmenting, or, supplementing existing communicative behavior or as an alternative to some type of existing behavior.

Again, the critical point is all individuals with AS communicate! There is no such thing as an individual with no current means of communication. The referrals I typically receive often times are precipitated by the impression our child does not presently have a method of communication. What the individuals are instead conveying is we're not happy with the existing method of communication and we'd like to replace it and/or supplement it in some way.

Communication Methods

Various Techniques

We find individuals using various methods of communication with varying levels of success. It can include pointing, speech, vocalizations, facial expressions, gestures, and many other methods. So long as these various techniques are serving a useful purpose with one or more conversational partners, we did not want to eliminate them.

Why Does an Individual with AS need an AAC System?

Sign Language and AS

That brings us to an important consideration regarding the use of sign language by individuals with AS. Research has indicated the majority of ASL signs are not transparent. In other words, even when many of these signs are produced correctly, others with no signing background are highly unlikely to be able to guess their meaning. This is a recipe for communication breakdown that is only compounded when signs are further modified to accommodate individuals' physical and intellectual limitations.

Casey's situation underscores the importance of selecting and teaching methods of communication that are not only effective with familiar partners but those unfamiliar with the method but also the individual using it. We want individuals to learn to communicate with as many people and in as many settings as possible. By teaching a method of communication that is only effective with a small group of partners we are limiting an individual's ability to establish relationships with others. Again, communicating with a familiar partner with a familiar method of communication will indeed be effective in certain situations. However, when in an unfamiliar situation or communicating with an unfamiliar partner and the individual finds their method of communication no longer successful we have a recipe for a communication breakdown. When breakdowns do arise we indeed have a recipe for a challenging, such

as aggressive behaviors as well.

Supplementing Skills, not Aggression

Still, we recognize these behaviors as a whole may be limiting the range of messages individuals may express and the variety of people with whom they may be used effectively. They may be especially problematic when interacting with others who are unfamiliar with individuals and/or the methods by which they communicate. The goal then is to supplement, or, augment, these skills with other methods of communication.

An AAC system can provide access to messages previously 'unspoken.' The important point is that we are supplementing what is already useful and already appropriate with some listeners in some situations. Conversely we do not want to supplement challenging behaviors such as aggression. Instead we want to replace such behaviors with desirable alternatives. Let's talk about AAC systems in terms of alternative methods of communication.

Pulling another individual's hair may be an effective way of requesting attention. If I'm seated beside a child and my hair is pulled my instinct is going to be to engage that child. The request for attention has indeed been successful. However this is unlikely to be a behavior that we want to encourage. Instead, the goal becomes teaching the individual an 'alternative' means of conveying the same intent, 'I want your attention.'

Case Example: Jason

There are a few other situations in which AAC systems are introduced as alternatives rather than supplements to existing methods of communication. For example, Jason's natural gesture for requesting snack, forcefully slapping his hand on a table, may be ambiguous and thus not understandable to many communication partners. It is thus likely this behavior will fail to elicit the desired outcome; it's not effective. When the behavior fails initially, Jason may persist and continue banging the table. The behavior may even escalate - Jason may bang his head on the table forcefully and attempt to scratch another individual situated within reach.

When Jason's challenging behavior fails to elicit a desired response, it is ineffective. If it takes an inordinate amount of time for his listener to interpret and respond as Jason desires, it's inefficient. If the behaviors are neither socially appropriate nor efficient nor evident in the behavior of typical peers from any cultural group in the same situation, we can also conclude they are unnatural.

AAC Systems: Effectiveness

Let's look at these three aspects of AAC systems, effectiveness, efficiency, and naturalness, in greater depth, beginning with effectiveness.

Effectiveness is measured primarily in relation to a method's resulting in a desired consequence. For example, Tara points to a photograph of a cup. The spoken message, "I'm thirsty. Can I have a drink?" is generated by her device. Her Mom responds by pouring her a cup of juice. Tara's attempt was effective.

Case Example: Casey

Conversely, another child, Casey has been taught a sign to request a drink. Although her speech-language pathologist would have preferred it if Casey produced the sign accurately, Casey's motor limitations prevent her from doing so. Instead of bringing a cupped hand to her mouth, Casey taps her

mouth with her right hand with her fingers fanned out. On one occasion an unfamiliar adult approaches Casey and asks what she wants. Casey produces her modified sign for 'drink'. The adult is unable to interpret Casey's sign and cannot provide the response Casey is seeking. Casey is forced to resort back to a previous behavior that had a history of generating effective responses - she spits at her listener.

Sign Language and AS

That brings us to an important consideration regarding the use of sign language by individuals with AS. Research has indicated the majority of ASL signs are not transparent. In other words, even when many of these signs are produced correctly, others with no signing background are highly unlikely to be able to guess their meaning. This is a recipe for communication breakdown that is only compounded when signs are further modified to accommodate individuals' physical and intellectual limitations.

Casey's situation underscores the importance of selecting and teaching methods of communication that are not only effective with familiar partners but those unfamiliar with the method but also the individual using it. We want individuals to learn to communicate with as many people and in as many settings as possible. By teaching a method of communication that is only effective with a small group of partners we are limiting an individual's ability to establish relationships with others. Again, communicating with a familiar partner with a familiar method of communication will indeed be effective in certain situations. However, when in an unfamiliar situation or communicating with an unfamiliar partner and the individual finds their method of communication no longer successful we have a recipe for a communication breakdown. When breakdowns do arise we indeed have a recipe for a challenging, such as aggressive behaviors as well.

Enhanced Natural Gestures (ENGs)

Is there a way of getting around these problems with signs for someone like Casey?

Casey might be deemed a strong candidate for an alternative to ASL referred to as Enhanced Natural Gestures.

Enhanced Natural Gestures (ENGs)

I developed this method specifically for individuals with Angelman Syndrome, although it is certainly applicable for those with other severe disabilities as well. A primary advantage of Enhanced Natural Gestures is the fact that all of these gestures are by definition readily interpreted by familiar as well as unfamiliar communication partners. Also, they call upon physical and cognitive skills the individual has already demonstrated to be within their grasp.

Contexts for Effective Communication

Different Contexts, Different Behaviors

Let's talk about situations in which communication behaviors are effective in some contexts but not others. We may not want to discourage such behaviors. In particular we don't want to encourage people with whom these behaviors have proven to be effective to all of a sudden pretend they don't understand

the individual and expect the individual to shift to a different method of communication. One situation I have encountered frequently has involved individuals whose natural gestures are easily understood by their parents and siblings, but typically misinterpreted by others. Their teams may recommend parents cease responding to these behaviors at home in order to be consistent with school expectations that children replace these behaviors with more conventional ways of communicating.

Parents often object to this recommendation. They have found themselves to be effectively communicating with their child and don't want to compensate. They don't want to change these behaviors in that they are already finding them to be effective.

Teachable Moments

Perhaps one fair compromise can involve parents continuing to accept these gestures, but seizing on teachable moments to model and elicit alternative methods of communication. For example, Ms. Brown knows that when Charlie runs to the patio door and begins jumping up and down he is requesting to go outside. Charlie has used this gesture for years and has found it to be effective with his mother. It would be unreasonable for Charlie as well as Ms. Brown to one day find themselves in a situation in which Ms. Brown pretends she no longer understands Charlie's gesture and prompts him to use an alternative method of communication such as a speech generating device, also referred to as an SGD. Instead, Ms. Brown might verbally acknowledge Charlie's intent, "OK Charlie, you want to go outside" and then casually model how to access the same message on Charlie's device. She has paired the existing behavior with one she wishes Charlie to use in the future. This might also be an example of augmented input. Ms. Brown is demonstrating to Charlie an alternative means by which he can convey the same behavior that he has previously conveyed by jumping up and down by that patio door.

AAC Systems-Efficiency

Efficiency

In addition to being effective, AAC systems should be as efficient as possible. Efficiency relates to the amount of time or effort that expires between a communicative attempt and a desired outcome. For example, Kim's mom is encouraging her to use an electronic speech-generating device to ask her to go out to the playground. Kim reaches for her device and tries to activate the symbol for playground. Due to a lack of motor control she wavers over the symbol and those surrounding it for several seconds. Finally she loses patience and throws the device at her mom.

This was a problem with efficiency in terms of the amount and duration of effort. Kim may learn her goal can be attained far more quickly by throwing her device rather than using it to construct a message. If this device is to be encouraged a more efficient means of accessing it is called for. Otherwise the device might need to be modified or a different device might need to be introduced.

Again this is an important point. The device may be an effective method of communication so long as Kim is willing to engage in the waiting behavior and the patience necessary to use it. However where efficiency has posed such a problem it is not indeed going to be used effectively nor efficiently.

Case Example: Beth

Problems sometimes arise when we try to promote effectiveness at the expense of efficiency. Take the case of Beth as an example. Beth is using a non-electronic communication board. She approaches a staff person and points to the symbol "TV". Staff responds, okay I know you want me to turn the TV on but you need to say the whole thing. The staff prods Beth to point to a series of three symbols, "Beth. Want. TV." Beth loses patience midway through the routine and tries to pinch the staff.

This is a situation in which Beth already communicated *effectively* by conveying a single symbol, TV. As such the message should have been accepted. It was effective. The staff person might have used this as an opportunity to then model the three-word phrase but would not require Beth to imitate this as a condition for having the TV turned on. Instead, in an attempt to encourage a more elaborate response from Beth, Beth's resulting behaviors were neither effective nor efficient.

Case Example: Sarah

Lets' contrast this with the case of Sarah. Sarah wants to be taken to the swimming pool in her back yard. . She hovers nears the sliding door of her home and whines. Her father responds, "Sarah, I don't know what is bothering you. " Sarah reaches for her iPad and points to the symbol for the family pool. The message, "can we go for a swim?" is spoken with a single touch. Her Dad complies with this request, which Sarah generated rapidly and with little effort. It was both effective and efficient. Ideally we want to encourage individuals to move from single symbol messages to those that are increasingly lengthy and syntactically complex. This will expand the range of meanings they're able to access. However in doing so we must always consider the tradeoffs between effectiveness and efficiency.

AAC Systems-Naturalness

Natural Behaviors, Easily Understood

We need to strive for AAC systems that are not only effective and efficient but also natural. In other words we want to see individuals using communication behaviors that are conventional and easily understood by others. Often this implies similar behaviors are used by typical peers in the same situation. Let's consider the earlier example of sign language. A natural sign would be one that is typically used by others using that same method of communication. Once that sign is modified or distorted it is no longer natural.

It is essential others easily interpret these methods or else previously successful aggressive behaviors will be maintained. For example, natural gestures may be Jon's preferred method of communicating. However, if his natural gestures are idiosyncratic in that they do not resemble gestures used by others in the same situation, their use may frequently result in misunderstandings and communication breakdowns. This may be especially common when Jon interacts with unfamiliar communication partners. Jon may resort to aggressive behaviors in situations in which gestures he has found successful with some partners are ineffective with others.

Despite limitations imposed by natural gestures, researchers have determined this is the single most frequently used and preferred method of communication by many individuals with Angelman Syndrome. This occurs irrespective of other methods of communication, including AAC devices with speech output that are available to them. Building on a previous theme, we may want to replace ambiguous natural gestures with more conventional, readily understood methods.

Effective, Efficient, Natural Gestures

However, what do we do about children's gestures that are effective, efficient, and natural? We supplement rather than replace them. These gestures are both important and functional with certain partners in certain situations and thus should not be discarded.

The Four Components of an AAC System

The Four Components of Augmentative and Alternative Communication

Does AAC refer to a specific device or method of communication or does it imply something more? Let's talk about the four components of an AAC system. In so doing I want us to be wary of the notion of a 'silver bullet.' I'll explain that in just a moment. I've encountered many situations in which families as well as educators search for the AAC device that will resolve an individual's communication difficulties and thus eliminate their use of aggression and other challenging behaviors. I've referred to this as the 'silver bullet.' The reality is these devices do not exist. Even when an ideal method or device is identified, it must be introduced as one component of a broader AAC system for it to be effective, efficient, and natural.

Symbols, Strategies, Techniques, and Methods

All AAC systems are comprised of four basic components: symbols, strategies, techniques, and methods, or devices. Successful programs address all four of these components. I will discuss each in turn, beginning with symbols.

AAC Component 1: Symbols

AAC Component 1: Symbols

Symbols refer to the way in which different meanings and concepts are represented. For example, the meaning "chair" or "sit" could be conveyed by pointing to an actual chair, part of a chair, a photograph, picture, line drawing or the printed word "chair". Symbols are often arranged in a hierarchy from concrete to increasingly abstract. Children with the greatest developmental challenges, particularly cognitive and linguistic, may gravitate to the low end of the hierarchy whereas more abstract options are available to those with greater developmental skills. All things considered, as individuals use increasingly more abstract symbols they gain access to increasingly greater numbers of symbols and abilities to use symbols to convey more and more messages.

Objects

At the most basic level we have actual objects. For example, Sam is learning to make basic choices throughout the day. This program is proving to be very effective in limiting challenging behaviors arising in situations in which others have anticipated Sam's preferences and made the wrong choices. Throughout the day, Sam is presented opportunities to make choices. When he arrives at school he is able to tap a child on the shoulder to make a selection which of two classmates, both positioned near him, he wishes to assist him in removing his coat and putting away his belongings into his cubby. He is then presented with a choice of two objects that correspond with two centers in the preschool classroom he has indicated preferences for in the past. It is now time to join the rest of the class on the floor for morning circle. Sam reaches for a remnant of a rug square that matches the larger

rug he is expected to sit on while in circle. Once in circle, his teacher is prepared to read the class a story. It is Sam's turn to request which of two books he would like the teacher to read to the whole class. His teacher offers both books to Sam and Sam indicates his preference. Additional opportunities to make choices via object use occur throughout the day and are embedded in routines throughout the day.

Other Symbols

While individuals with especially severe intellectual disabilities may rely on objects to communicate, most individuals with AS grasp increasingly more abstract symbols such as photographs, pictures, line drawings, and even printed words.

Is it an either or proposition an individual uses one type of symbol or another? It's very important to point out that an individual's system may contain two or more different types of symbols at various levels. We often find it useful to pair a symbol the child already grasps (e.g. a picture) with one we wish to teach, such as a printed word. Often the two are paired on a communication display and presented simultaneously. It's important to remember that AAC devices not only provide means of communication but can also be used to teach increasingly more abstract language.

Many Options

When selecting symbols, keep in mind there are numerous options to consider at any level of the hierarchy. For example, Mayer-Johnson Picture Communication Symbols or PCS are now used in many cases without considering other picture inventories.

Children with limited numbers of symbols have correspondingly less access to means of conveying thoughts, ideas and feelings. As such probability of communication breakdowns and resulting displays of aggression are heightened. When a meaning can't be expressed through a conventional means of communication, it's not surprising to find individuals resorting to challenging behaviors instead. Finding the right combination of symbols for any individual is an important component of an AAC assessment.

AAC Components 2 and 3: Strategies and Techniques

AAC Component 2: Strategies

Most strategies are intended to foster efficiency. As I discussed earlier, the more quickly individuals are able to convey messages conventionally, the less likely they are to abandon systems in favor of challenging behaviors. Examples of strategies include icon prediction. As the child points to one symbol, subsequent symbols that have been used in combination with this symbol are highlighted on the display to make the further search process more efficient. Additional examples of strategies designed to increase rate of communication include letter and word prediction. Other strategies, such as dynamic displays, provide access to increasing numbers of symbols than might be conveyed on a single screen. Using Dynamic Display a child can point to a symbol and then navigate to a second and third level of selections.

Visual Scene Displays offer an interesting way of organizing symbols. A scene, such as a picnic, is presented to the individual. As she touches different locations, or hot spots, different messages are produced. There are no data available pertaining to the usefulness of visual scenes or any of these other strategies for individuals with AS.

AAC Component 3: Techniques

These relate to how individuals access symbols. There are two ways of doing so, scanning and direct select. Most individuals with AS have the ability to use a direct select device. Ideally the individual has mastered a discriminate point and can move their finger, usually the index finger, directly to the intended symbol and activate the corresponding message. There is a direct relationship between the point and the resulting message.

Individuals who are unable to point with a finger may use other ways to accessing symbols. These include head and chin pointers. However, as I stated, the vast majority of children and adults learn to transition from indiscriminate fanning of their entire hand to more discriminate selections involving an index finger.

I am not going to spend time on the second technique, scanning, since it's rarely used by individuals with AS. This method involves the individual waiting as symbols are presented, typically row-by-row and then column-by-column. The individual uses a switch to stop the scan on a desired message.

AAC Component 4: Methods and Devices

AAC Component 4: Methods and Devices

The fourth and final component of an AAC system is the method itself. This can be an unaided form such as natural gestures, Enhanced Gestures, signs, vocalizations, and words which do not require any external equipment, or an aided system, such as a device, that does.

The team needs to begin by evaluating the individual's capabilities across multiple domains. This requires both formal and informal testing and includes assessment of intellectual ability, motor, sensory, language, and communication functioning. The team also identifies individuals' present and anticipated needs for communication. What types of messages would enable the individual to participate most effectively in the greatest number of different settings? Based on these evaluations, parameters of an ideal system are delineated. The team then explores aided and unaided methods that have the greatest potential to meet these capabilities and needs.

Feature matching involves connecting device or system characteristics and demands the individuals' capabilities and needs. We are looking for a goodness of fit between the two.

Multimodal Communication

Recent researches have demonstrated individuals with and without deletions accept and use rather sophisticated speech generating devices successfully. It is very important to provide individuals opportunities to explore and use such devices, as appropriate, rather than limiting them to low-tech devices that restrict the number and variety of meanings they may convey.

Then the job seems to be finding the one method by which an individual will be able to communicate most effectively. Is that the case? As I indicated earlier, it's highly unlikely even the best prescription will result in selection of a single device that will function as a 'silver bullet' on its own and address all communication needs, resolving issues with aggression and other challenging behaviors. To the contrary,

individuals proving to be the most effective communicators are often multimodal communicators who rely on combination of different aided, such as communication devices and aided, such as Enhanced Natural Gestures, methods of communication.

Code Switching

A single individual may use natural gestures, Enhanced Natural Gestures, physical manipulation, a non-electronic communication book and a speech-generating device. The key is for the individual to shift from one method of communication to another based on what's likely to be most effective, efficient, and natural in a particular situation. We refer to this as code switching.

How about an example of this? Ben is asked why he is upset and responds with a series of gestures. His partner, Jesse, is confused and indicates she doesn't understand what Ben is trying to communicate. Ben spontaneously reaches for his AAC device and communicates he wants to go home. Rather than reacting with a behavioral outburst in response to his listener's failure to comprehend his initial message, Ben recognized the need to code switch and repair the conversation by shifting to a different method of communication. This is another important skill to be taught and encouraged.

Alternatives to Aggression and Challenging Behaviors

Augmented Input

In a recent survey of parents of individuals with AS, the respondents stressed the importance of their individuals having access to others using the same or a similar device to that used by their children. Augmented input, a form of modeling, can address this need. For example, when Charlie's younger sister Corie wishes to go outside she might borrow Charlie's device and use it to make this request. Throughout the day, in and around home, Charlie's family and friends incorporate use of the device into their interactions with Charlie. When Charlie goes to school his classmates and teacher incorporate use of the device into their routines and interactions. Throughout the day Charlie has opportunities to observe his device being used successfully and in ways he may not currently be using it himself.

New Additional Strategies

Based on a review of the more general literature pertaining to individuals with severe disabilities and complex communication challenges, we find several strategies are cited frequently in terms of their fostering AAC skills. Let's take a look at some of these strategies.

Fostering Our Child's Most Effective Uses of an AAC System 1

- When interacting with your individual, make sure you and others are speaking directly to him rather than filtering comments through others. It is not uncommon to see situations in which people address all comments directly to an Aide as though the individual isn't present. Make it a point to redirect the speaker to your individual.

- Make sure you give your individual sufficient time to communicate. Individuals with AS require time to process information, think about what they wish to communicate, and then do so. The latency can last several seconds. Wait patiently. Don't fill the quiet time with additional questions or repetitions of what you have already said. This only presents your individual with additional processing demands, further delaying his ability to generate a response. This can

be a cause for frustration, taking the form of various challenging behaviors including throwing the device to the floor.

Fostering Our Child's Most Effective Uses of an AAC System 2

- Make yourself as familiar as possible with your individual's AAC device..Parents of individuals with AS have reported a key element determining whether or not their children accept and use electronic AAC devices involves the amount of initial and ongoing training they and their parents receive.

- If you want to stimulate lengthier responses from your individual, try relying more heavily on comments rather than questions. For example, you might prompt more language by commenting, "You look like something special happened at school today" rather than posing a direct question, "What did you do at school today?"

- Make your individual's communication device available and accessible at all appropriate times.When not in use, place the device in a consistent location so your individual can find it easily.

- Avoid mode devaluation. Accept all communicative attempts, particularly those that are effective in getting your individual's point across. Don't ignore one method of communication relative to another. Encourage multimodal communication and code switching, as we discussed earlier.

- If you want to encourage your individual to use a device more frequently, think about situations in which the device is the only way of conveying the necessary meaning or at least the means of doing so most efficiently.For example the device may be the only place the necessary vocabulary is located. Also, as discussed earlier, provide augmented input to model effective and appropriate uses of the device.

- If possible, try to locate another individual, ideally one roughly the same age, who relies on the same device or one similar to it to serve as an AAC mentor. If willing, the mentor can engage your individual in interaction from time to time, modeling use of the device.

Fostering Our Child's Most Effective Uses of an AAC System 3

- Consider simplifying your verbal input to your individual. Failure to understand you may be a source of anxiety and frustration for your individual and another trigger for aggressive behaviors. Try tagging repeated, simplified utterances to the end of your otherwise age-appropriate utterances.

- For example, you might say, "Okay Tom, it's time for work. Let's go out to the bus...Okay Tom bus." or "OK Kevin, you can watch TV for ten more minutes but then it's time for bed...TV then bed."

- If helpful, slow down your rate of speech and try to emphasize words in utterances that carry the critical meaning.

- A school aide might modify her directions to a young man by saying, "OK Shamus, let's get your **Vantage** out of your **backpack;** It's time for **lunch.**" "Let's go down to the school **office** and drop off these attendance sheets with **Ms. Gerrity**."

- Avoid using language that is infantilizing (i.e. baby talk). Among other things this sends a negative message to others that your individual should be treated like an infant.

- Try to provide reasons and opportunities for your individual to communicate throughout the day.This is very important. Without reasons and opportunities there is unlikely to be much communication.

- Give your individual lots of positive feedback when he or she communicates effectively (e.g. "Thanks for using your device.").We refer to this as Differential Reinforcement of Behavior - reserving positive feedback for situations in which your individual does something you have been striving to see.

- Make sure to integrate communication instruction throughout the day, rather than at specific times of the day.This is as important for school and other settings as it is for home.

Integrated Objectives

Effective Communication Throughout the Day

We want to get out of the practice of reserving specific units of time each week that are allocated for communication instruction (e.g. Tuesdays and Thursdays from 1:00-2:00 with the school speech-language pathologist [SLP]). If we want individuals to communicate effectively throughout the day, it's important to target skills accordingly.

Case Example: Bryan

Here is an example of a Matrix system that was used to target communication objectives over the course of the school day for Bryan, a 12-year-old child with Angelman Syndrome. The procedure begins by laying out the individual's day, in this case class by class from morning meeting to science. Next, the various objectives, one component of which is communication, are listed along the margin. The team convenes and identifies when each objective will be targeted, placing an 'X' in the corresponding area. For example, "making choices" will be integrated during music and recess. The special ed teacher and general ed teacher collaborate briefly in advance to discuss how each objective can be targeted in each corresponding block of time. The special ed teacher consults with Bryan's Aide and the actual activities are identified. The Aide attempts to target each objective no fewer than three times in each block.

If we look at making choices during music we see the notations PSP. That means Bryan made a choice spontaneously ('S') once and required partial assistance ('P') on two other occasions. Looking at data collected on remaining objectives we see the notation 'F' appearing in some cases, indicating full assistance was necessary for Bryan to demonstrate the desired behavior.

In the case of Bryan, the team actually rotated objectives across classes from one week and, on occasion, even one day to the next. For example whereas making choices was targeted in music and recess one day it might be targeted during health class on another occasion. In the case of a student with aggressive behaviors we might identify specific alternatives to these behaviors, as in the example with Bryan, target these alternatives at pre-determined times throughout the day. The same matrix system could be used with adults. The primary difference would lie in the daily schedule appearing from left to right at the top of the matrix.

[**END PAGE:** Integrated Objectives]

Integrated Objectives with Matrix Model

Integrated Objectives with Matrix Model

Consistent with the Matrix system, parents and others may want to advocate for integrated rather than isolated, discipline-specific objectives. Let's look at several examples of integrated objectives that are consistent with the Matrix model.

Table with Integrated Objectives

In reviewing this slide I'd like you to pay particular attention to the AAC applications, which appear in parentheses. Beginning with Sarah, we see her broad goals of choice making and developing friendships are being targeted by encouraging her to use the AAC device to invite a classmate to join her during silent reading. In Trevor's case, our goal is to teach him a conventional, socially appropriate alternative to challenging behaviors when he wishes to indicate a desire to have a pleasurable activity continue. Finally, in the case of Melissa, another individual exhibiting challenging behaviors, our AAC application once again involves encouraging her to use an alternative to challenging behavior to signal a desire to have an unwanted object removed. We also see attention paid to expanding the range of functions, or, intents in all three of these cases.

Helpful Websites for More Information

Online Resources

There are several websites you may want to visit for additional information about AAC. Here are some of my favorites. The **ASHA** website is excellent in that it can take you to many other sites containing information about AAC. A second site with lots of information, as well as useful links to other sites can be found at the Google site. One of the better sources of family friendly information concerning young children is the **YAACK** site. Finally, in order to learn more about AAC devices including switches and manufacturers, you may want to visit the **USSAAC** site.

That concludes our discussion of communication and aggressive behaviors. Thank you for joining me today.

Module Authors

Stephen Calculator, Ph.D.

Dr. Calculator is Professor and Chair in the Department of Communication Sciences and Disorders at the University of New Hampshire and an Adjunct Professor of Pediatrics at Dartmouth Medical School in Hanover, NH. He earned his doctorate in Communicative Disorders from the University of Wisconsin-Madison in 1980. Dr. Calculator has published and lectured extensively in the areas of augmentative and alternative communication (AAC) and inclusive education for students with severe disabilities, drawing upon his ongoing experiences as a consultant to numerous schools and other agencies in the USA and beyond. His consultations have included work with more than 50 individuals with Angelman syndrome, providing assistance to families and other team members in developing educational and communication programs. Dr. Calculator authored a self-study designed to teach families and professionals how to use Enhanced Natural Gestures with their individuals with Angelman syndrome.