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A Glossary of Behavior Analytic Terms for Speech-Language Pathologists' Considerations for Augmentative and Alternative Communication

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At its core, productive collaboration between speech-language pathologists and behavior analysts requires effective communication between both parties. Successful communication can be gained in part through mutual training on terminology, principles, and practices of each field. The purpose of this article is to familiarize speech-language pathologists with key behavior analytic terms and principles as they relate to practices in augmentative and alternative communication. Where possible, parallel terms and practices within speech-language pathology are presented to highlight commonalities between the fields. In addition, this article will detail important considerations for augmentative and alternative communication intervention as guided by the behavior analytic terms and principles discussed.

In an effort to ensure the highest quality of care across settings, the American Speech-Language-Hearing Association (ASHA, n.d.) supports collaboration between speech-language pathologists (SLPs) and related professionals through interprofessional education (IPE) and interprofessional practice (IPP). According to ASHA,

> IPE is an activity that occurs when two or more professions learn about, from, and with each other to enable effective collaboration and improve outcomes for individuals and families whom we serve. Similarly, IPP occurs when multiple service providers from different professional backgrounds provide comprehensive healthcare or educational services by working with individuals and their families, caregivers, and communities… (para. 1)

IPE and IPP are especially important in the area of augmentative and alternative communication (AAC). Hartzheim (2017) noted, "The team approach is crucial to ensure success in the use of the AAC system across all environments and to generalize and maintain skills acquired during interventions" (p. 272).

Both SLPs and behavior analysts (BAs) are important members of AAC teams (Hartzheim, 2017). Yet, conflicts between these professionals are evident, particularly on social media platforms (Cardon, 2017). One barrier to effective collaboration between SLPs and BAs may be the absence of a common language. Because of discipline-specific jargon, both professionals may use the same terms to refer to different phenomena and use different terms to refer to the same phenomena. Unclear terminology can generate communication breakdown. One purpose of this article is to define key terms from the science of behavior analysis that might prove helpful for SLPs on AAC teams with BAs. These terms are italicized within the article and summarized in the Appendix. Clarifying behavior analytic terminology, including similarities and differences within speech-language pathology, can contribute to essential IPE for IPP.

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It is understood that the science of applied behavior analysis is utilized in many fields and many SLPs have had extensive training in the use of behavior analysis in their graduate programs or in postgraduate training. In 1969, ASHA published a monograph entitled, "A Functional Analysis Approach to Speech and Language" (ASHA, Monograph Number 14), pointing to the strong behavioral underpinnings of our field. Schielfelbusch (1969) wrote in the preface to the ASHA monograph,

> "The systematic framework used in this monograph is referred to frequently as the functional analysis of behavior. The system includes a two-step procedure for the evaluation of behavioral change: (1) establishing a baseline of the behavior and (2) assessing the conditions that maintain and modify the behavior under consideration. The first pertains to the exact kind and rate of the speech behavior under consideration. The second includes an analysis of the environmental conditions under which speech behavior is developed, maintained and modified." (p. vii)

Nonetheless, there may be a wide variety of experiences and training in behavior analysis for SLPs, so this article can serve as either a refresher or an introduction to behavior analytic terminology.

Another barrier to collaboration between SLPs and BAs may be that overlapping scopes of practice are guided by different conceptual frameworks. Cardon (2017) surveyed professionals from both disciplines and found that SLPs and BAs reported vastly different theoretical approaches to language acquisition:

> "These differences may be an indicator as to why there are distinct differences in the intervention approaches subscribed to by each discipline" (Cardon, 2017, p. 39).

Nonetheless, the aforementioned descriptions of IPE and IPP do not specify that different disciplines must agree on all elements of theory and practice for productive collaboration. Interprofessional teams can still benefit from evidence-based tools derived from various disciplines without absolute agreement. Thus, a second purpose of this article is to highlight how the behavior analytic principles and tools defined can be effectively applied in collaborative decisions related to AAC. Certainly, a parallel article could be written to inform BAs on terminology and beneficial practices derived from speech-language pathology, but this is not the focus of the current article given the demographics of most readers. The following section will begin discussion by describing a behavioral account of the social-communicative environment.

Communication Environments

The *three-term contingency* is the underlying framework that guides all practices in applied behavior analysis. It involves an analysis of "the antecedent that is present when the behavior occurs, the behavior, and the reinforcing consequence" (Miltenberger, 2001, p. 499). *Antecedents* are environmental events that occur before a response and occasion it. Alternatively, *consequences* are environmental events that occur after a response and determine its future probability. A *behavior* (or *response*) is anything a person does that is observable and measurable. Antecedents, behaviors, and consequences can each be either social (i.e., involve the presence of or interaction with another person) or nonsocial.

Many SLPs recognize that communication is fundamentally social and occurs within a communicative environment. BAs examine this speaker–listener environment through the framework of the three-term contingency. More specifically, they investigate what antecedent(s) might occasion a communication response and what consequence(s) might increase or decrease its occurrence in the future. Given the social nature of communication, its antecedents and consequences must involve another person but may not be exclusively social. For example, labeling a dog in a picture book is minimally occasioned by the presence of another person (social) and a dog picture (nonsocial) in the antecedent condition. In the consequence condition, asking

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a teacher to open a bottle of water would be increased or decreased in the future based on what the teacher does (social) to the water bottle (nonsocial) when asked. The three-term contingency provides a systematic way to both analyze the social-communicative environment and guide intervention. The remaining sections of this article will examine in detail key terminology related to each element of the three-term contingency, including application to AAC decisions.

Key Antecedent Factors

Multiple antecedent variables derived from BA are relevant to the practices of AAC teams. Some of these include motivation, stimulus control, and prompts.

Motivation

Motivation, also referred to as *motivational operation* or *establishing operation*, is one of two antecedents involved in all communication responses, no matter what is said, how it is emitted, or if it is successful at any given time. Motivation is defined in behavior analysis as an antecedent that alters the value of a stimulus and impacts the likelihood of any response that might access that stimulus (Michael, 1993). In other words, motivation (a) temporarily increases the value of a specific reinforcer and (b) temporarily increases all behaviors that have led to receiving that reinforcer in the past. A *stimulus* is anything in the environment that can be discerned by the senses. It can be either internal (e.g., feeling hungry or full, having a headache) or external (e.g., a good book, a favorite toy, another person). Motivation is commonly described as "wanting something."

Because of the social nature of communication, communicators must "want something" (e.g., an activity, item, information, general attention) from their communication partners before communicating. In other words, we only communicate if we find value in something the communication partner might do. This sentiment is reflected by the National Joint Committee for the Communication Needs of Persons With Severe Disabilities (www.asha.org/NJC):

> A seeming lack of interest on the part of an individual may actually be traced to a lack of identification by service professionals of activities about which the individual might be motivated to communicate. The appropriate response is to examine carefully the ways in which motivation can be enhanced and opportunities for communication provided. ("The Individual Appears Disinterested," para. 1)

Thus, in terms of AAC intervention, the more interested a learner is in the instructor and the materials and activities presented, the more valuable the instructor becomes, and the more motivated that learner will be to communicate to the instructor. If the intervention team's aim is spontaneous communication, a critical step would be creating situations that ensure the AAC user will want to communicate. Likewise, if a learner is not approaching instructors or otherwise indicating a desire to communicate to them, the intervention team likely has not created enough situations to make themselves valuable to the learner.

Motivation can vary from one moment to the next. Instructors must be keen observers of motivation and also may actively alter motivation. Michael (1993) explained several ways that instructors can alter the environment to impact motivation. *Satiation* occurs when an individual receives too much of a stimulus and therefore its value decreases (e.g., repeated, lengthy exposure to a preferred toy decreases motivation to obtain it). On the other hand, *deprivation* occurs when a stimulus is depleted or limited and its value increases (e.g., minimal exposure to a preferred toy increases motivation to obtain it). For example, for an early communicator, it might be helpful to have only favorite toys available when the SLP is present to keep the value of interacting with the SLP and communicating about the particular toy high. In addition to satiation and deprivation, *conditioned motivation* can occur in at least two ways (Michael, 1993). One way involves repeatedly pairing known preferred stimuli with previously neutral stimuli. For example, if a child only ever receives his or her favorite snack while reading a book or playing with a new toy, the value of that book or toy increases, particularly when the child is hungry for his or her favorite snack. A second

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way motivation can be conditioned involves withholding or pausing a critical stimulus necessary to access or complete a preferred task. As an example, a child may be given his or her favorite dollhouse without furniture, increasing the value of the furniture. The latter method may be referred to as *environmental sabotage* by SLPs (e.g., Hanlon, Larson, Bellone, Hansalia, & Hutt, 2005).

Stimulus Control

The second antecedent event involved in all communication responses is *stimulus control*. Stimulus control is evident when a response is evoked only in the presence of a stimulus and not in its absence (Michael, 1993). In other words, a stimulus that has acquired control over a response will "turn on" that response in its presence and "turn off" the response in its absence. The specific stimulus that has acquired stimulus control is referred to as a *discriminative stimulus* (S^D; Michael, 1993). In analyzing communication, no response would be considered communicative in the absence of a communication partner, so the presence of another person would be the most essential S^D for communication. Thus, an AAC user pushing buttons on his or her communication device when no communication partner is present indicates that the team may have not adequately established the presence of a listener as an S^D for activating the device. However, most communication involves many more S^Ds than only the presence of the listener. In fact, S^Ds typically indicate to a communicator specifically what to talk about. Take the example of an AAC user looking at a picture book with his or her mother. If the learner is specifically looking at a picture of a dog and is motivated to communicate, that dog picture may result in the learner emitting "dog" on his or her AAC system as opposed to "bus." In addition to the presence of the learner's mother (i.e., a communication partner) and motivation to call mother's attention to the book, the picture of the dog would be an S^D that evokes a specific, relevant communication response.

Stimulus control is taught via *discrimination training*. During this procedure, a response is regularly reinforced or rewarded in the presence of a particular stimulus and not in its absence. (Reinforcement will be described in detail in a later section.) For example, if we say something in the presence of a communication partner who is oriented toward us, this response has a high probability of desired results. On the other hand, if we say something when a communication partner is not present or is oriented away from us, we are not likely to gain what we want. This discrimination training might be how we learn to communicate only in the presence of an attentive communication partner. Yet, discrimination training related to the presence or absence of a communication partner is not sufficient to teach us what to say. An increasingly popular philosophy in AAC intervention involves responding to all communication attempts as if they are meaningful to the current situation. Using the aforementioned example of shared book reading, if the AAC user is specifically looking at a picture of a dog and emits "bus" on his or her device, the mother may reward that response with "Yes! We saw a bus yesterday, didn't we?" Looking at the same picture, the learner may emit "bird" and the mother may reward the response by affectionately tweeting like a bird. Given the definition of discrimination training provided, this instructional method might teach the AAC user to select buttons on the device in the presence of his or her mother. However, it will not adequately teach the user that seeing a dog is an S^D for emitting "dog." In other words, it does not teach the learner what to say.

Another important consideration of stimulus control is that, when teaching word combinations and sentences, each word used in the sentence must have separate stimulus control in order for those words to be used flexibly to create a wide variety of phrases and sentences. Consider if the phrase "shoe on" was always pointed to when a parent was putting on a child's shoe. It would be clear that the words did not have separate stimulus control if the toddler pointed to a shoe and emitted "shoe on" to label the shoe. When first teaching language with any AAC system, it will be important to teach each word separately under the correct stimulus control.

S^Ds differ from motivation in that they are established precisely because they signal the availability of a valuable stimulus, whereas motivation can be established independent of the

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actual presence or availability of that stimulus (Michael, 1993). A learner may not have received much adult attention for a while, establishing motivation to obtain adult attention. However, wanting attention does not make attention available. (Perhaps, no adults are present in the room.) On the other hand, the presence of an adult in the room and/or an adult orienting toward the learner all signal that adult attention might be available. Therefore, these stimuli would be considered S^Ds for any specific response to obtain attention. In summary, behaviorally, both motivation and stimulus control are antecedents involved in all communication responses. The communicator needs to both want something from the communication partner and know what to say in that situation. Discrimination training helps ensure that what the child is communicating matches his motivation.

Stimulus control, motivation, and functional communication. The discussion above described the relevant antecedent conditions for emitting "dog" that might occasion a similar response in most people in our culture (e.g., motivation for a response from the communication partner, presence of the communication partner, and looking at a picture of a dog). It also both directly and indirectly described atypical conditions under which an individual might learn to emit "bus" (e.g., absence of motivation for a response from the communication partner, absence of the communication partner altogether, and/or looking at a picture of a dog). These examples illustrate the learned nature of communication; no response is guaranteed to occur under anticipated antecedent conditions unless they are strategically taught that way.

Indeed, a person may be taught to emit any type of word under any number of antecedent conditions. For example, a toddler may learn an idiosyncratic way to ask for a blanket when he or she wants it (e.g., lovey, bee bee, nosey, or ubby). An AAC user may learn to emit "want" whenever he or she specifically wants bubbles, crackers, or a hug. Although both of these responses may be effective for a limited group of communication partners in a limited number of situations, they do not have broad usefulness. In fact, the toddler will learn to call his or her blanket a "blanket" when asking a less familiar person to retrieve it because "ubby" will likely be unsuccessful. Similarly, "want" will be unsuccessful any time a communication partner does not know exactly what the AAC user might want. The National Joint Committee for the Communication Needs of Persons With Severe Disabilities (n.d.) referred to "communication understood by all communication partners" as *functional communication* ("Defining Functional Skills," para. 1). Communication is best understood, and therefore most functional, when it is emitted under similar antecedent conditions that occasion it in communication partners. For instance, in the presence of a large, soft, rectangular item that may cover a body for warmth, most English speakers would emit the word "blanket" and not "ubby," which would make "blanket" more broadly understood (and more functional) than "ubby." When people specifically want bubbles, they typically emit the word "bubbles" and not "want" alone, making "bubbles" more broadly functional than "want" in this case. In fact, most people never emit "want" alone when they want something specific, calling into question the functionality of ever teaching learners to emit this word in isolation.

Defining functional communication as communication understood by all communication partners has extensive implications for the vocabulary selected for AAC users and the antecedent conditions under which these words are taught. Consider the communication response of greeting. Most people only approach and greet others when they are motivated for the communication partner's attention. Yet, AAC programs may include goals on greeting that do not specify anything about a learner's motivation for attention from the people he or she is greeting (e.g., Zangari, 2012). For the communication event to be beneficial to the learner (i.e., functional), greeting should probably only be taught at times when the learner is motivated for the communication partner's attention instead of when attention is not particularly valuable. In addition, we typically only approach and greet people when we see them for the first time in a day but not the second, third, or fourth time. In other words, the first time seeing a person in a day may be considered an S^D for greeting, whereas subsequent encounters may evoke other responses (e.g., a question about how a person's day has been going). Incessant greeting or greeting at atypical times may result

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in the communicator being ignored or avoided. Therefore, it would benefit AAC users the most (i.e., be most functional) to teach them to greet only when it is the first time that day they have encountered a particular communication partner.

In this manner, it is important for AAC intervention teams to keep the "end game" in mind. That is, they should remain aware of what will most benefit a learner in the long run. In terms of vocabulary selection, a learner will likely benefit most from being taught words that have the greatest potential to be successfully understood by the broadest range of communication partners. When comparing "ubby," "want," "blanket," and "bubbles," the latter two words carry the biggest possibility for success when emitted in isolation with a wide range of communication partners. In terms of context for instruction, a learner will likely benefit most from being taught to emit words under antecedent conditions that match conditions that evoke the same words in the surrounding community. Learning to greet only when one wants attention ensures the communicator gains something from greeting, and greeting only at appropriate times ensures desired reactions from communication partners. This level of analysis of antecedent variables can help AAC teams to determine important teaching conditions and provide one area to examine if problems arise in instruction.

Prompts

A third antecedent variable to consider in AAC instruction is a *prompt*. A prompt is an "added antecedent stimulus that brings about a specific behavior" (Newman, Reeve, Reeve, & Ryan, 2003, p. 89). Unlike stimulus control and motivation, prompts are not part of all communication responses. Rather, they are the procedural (i.e., instructional) application of an added stimulus to ensure the desired response occurs. Because prompts are not the terminal controlling antecedent(s), it is important that they are systematically faded to elimination.

Prompting hierarchies are discussed in numerous studies across various disciplines (Finke et al., 2017; MacDuff, Krantz, & McClannahan, 2001). Research indicates that both most-to-least and least-to-most prompt hierarchies can be effective, with pros and cons to each hierarchy depending on the skill taught and learner characteristics. In behavior analysis, an added stimulus is not considered a prompt if it does not effectively evoke the desired response. Therefore, most prompts are strategically derived from already established skills. For example, an instructor might deliberately program model prompts after an observation that a learner has established imitation skills. If the learner does not yet imitate, the BA would likely choose a different prompting method that would allow the learner to be successful in performing the target skill. This phenomenon of introducing extra stimuli to increase the likelihood of success may be referred to as *scaffolding* in speech-language pathology and educational literature (van de Pol, Volman, & Beishuizen, 2010).

Consider a situation in which an AAC team aims to teach a learner to request to play with a specific preferred toy using his or her AAC system. First, the team would need to analyze the controlling antecedents that might occasion the same response in the surrounding community (i.e., the presence of another person, motivation to play with the toy, and inability to access the toy independently). The environment can be altered to establish motivation by limiting frequent and free access to the toy, and motivation might be observed in the learner through responses such as reaching, gazing, and smiling at the toy when it is presented. Once the terminal controlling antecedents are established, instructors can prompt the AAC response by presenting a stimulus that has already been observed to consistently evoke the behavior. For example, the instructor might model the response or use a picture, gestural, or verbal prompt if these stimuli have been shown to reliably result in the AAC response. However, when no previously established skills are available as effective prompts, a physical prompt is typically the most efficient alternative. Systematic prompt-fading procedures may then be employed to allow the child to request the toy under the appropriate antecedent conditions. Ideally, the prompt would be faded to elimination as soon as possible.

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In addition to using prompts to evoke expressive language on AAC systems, the AAC system itself may also function as a prompt at times, particularly when teaching receptive directions to learners with no hearing impairment. For example, if a teacher points to "sit" on the AAC system while she tells a learner to sit, the AAC system would be a prompt if the learner in fact sits. If the terminal goal is for the learner to eventually respond to speech (a goal that seems plausible and beneficial for learners with no hearing impairment), then the receptive direction should not be considered mastered until the learner is able to accurately respond to the instruction only when asked to "sit."

Key Behavior Factors

Along with describing factors related to the antecedent conditions of communication instruction, a behavioral analysis may also look at elements relevant to the AAC responses themselves. Two of these elements include the verbal operants and response effort.

Verbal Operants

As noted previously, a behavioral analysis of communication requires that we look at all communication responses according to their environmental antecedents and consequences. In 1957, Skinner was one of the first individuals to categorize communication according to common antecedents and consequences in his seminal work *Verbal Behavior*. A *verbal operant* is the term used to describe each category of unique antecedents and/or consequences. Verbal operants are not solely defined by their form. Most operants can be emitted through more than one communication modality (e.g., speech, sign language, pictures, or communication device).

Verbal operants are loosely analogous to *pragmatic functions* described within speech-language pathology. They describe both when and why a communication response may be emitted. Skinner (1957) discussed seven elementary verbal operants. This article will focus on the four operants most commonly targeted in AAC instruction. It should be noted that verbal operants rarely occur in isolation. They are considered the fundamental units of communication—the "raw material." Most communicative events would involve a combination of verbal operants. For example, if a person was asked, "What did you do this past weekend?" and responded, "I took my children sledding. I think they had a good time! What did you do?" the exchange would include a combination of mands for information, tacts, intraverbals, and autoclitics. Skinner describes an *autoclitic* as a verbal behavior that modifies the functions of other verbal behaviors. In the example provided above, "I think" moderates the strength of "they had a good time." There are a wide variety of autoclitics described in behavioral literature, including descriptive autoclitics, grammar and syntax as autoclitic processes, composition and its effect, self-editing, rejection, and defective feedback. It is beyond the scope of this article to go into detail about each of these, but interested readers are referred to Skinner and Lodi and Greer (1989) for a full description of each and their role on the development of complex communication.

Mand. A *mand* refers to a response that is controlled in the antecedent condition by motivation for a specific stimulus as well as the presence of a listener who can access that stimulus. The consequence of a mand is direct delivery of the stimulus desired. More simply, a mand occurs when the communicator wants something and says what he or she wants and another person delivers precisely what the communicator wanted. A common term for a mand is a *request*. It carries the most direct benefit for the communicator because it results in exactly what he or she requested. In fact, the mand is the only verbal operant in which the words used specify the consequence. When first selecting words to teach manding, it is important that the listener is able to respond as quickly as possible, especially once all prompts are faded. For example, if a learner has demonstrated motivation to play ball, teaching the learner to mand for the ball by saying, signing, handing over a picture, or pushing a button might be the first step. Language can then be added to teaching the child to clarify what he or she wants to do with the ball, which size of the ball he or she might want, or which color of the ball he or she might want. Manding also helps to condition motivation for attention by associating attention with delivery of all the learner's

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favorite things. For these reasons, manding is typically the first operant taught or recommended to be taught by BAs.

A "pure" mand is only controlled by the variables mentioned previously, so if a learner can only mand when given choices, when an item is present, or when asked "What do you want?" the learner has not mastered manding. Although it might be important to teach a learner to request under all these conditions, we would also want to make sure that he or she can request only when motivated to get something. In addition, mands can become much more complex than simple requests for objects. They can also involve asking for actions, people, missing objects, properties of items (e.g., adjectives, adverbs, or prepositions), removal of stimuli (e.g., refusing), attention (e.g., greeting, calling someone's name, or calling attention to oneself), and information (e.g., asking questions). In addition, directing the behavior of others and advocating for oneself would fall under the mand category. Thus, several pragmatic functions commonly discussed within speech-language pathology are enveloped by the mand. Careful sequencing of mand skills will result in the quickest and most effective acquisition of manding (Sundberg, 2008).

Tact. A common term for a *tact* is a *label*. The antecedent conditions for a tact include (a) presence of a listener; (b) some form of sensory, nonverbal stimulus (i.e., communicator sees, smells, hears, tastes, or feels something); and (c) motivation for generalized social attention. Unlike the mand, the consequence for a tact is not direct delivery of what the learner says; rather, it is some form of social interaction, typically related to the phenomenon tacted. For example, if a child points to the sky and says "Plane!" a parent might respond, "Yes, I see the airplane." In this case, the parent does not deliver the airplane but rather talks about it with the child. Thus, if a learner is not motivated to gain the attention of others, he or she is unlikely to use commenting spontaneously to draw people into interaction. In fact, conditions are "ripe" to teach spontaneous tacting when the learner is initiating joint attention to objects he or she clearly does not want. Like manding, tacting can be sequenced from simple to complex (Sundberg, 2008). Examples of complex tacts include tacts of private events, such as labeling emotions and pain. The common pragmatic functions of commenting, labeling, and describing may be encompassed under the tact category if they refer to events that are currently present and sensed by the speaker.

During AAC instruction, it is important to ensure that the learner is tacting under the correct stimulus conditions. For example, an instructor may model "I like that green snake!" on a device, and a learner may imitate "like snake." However, if the learner then pushes the snake away with a fearful expression, it is likely that the modeling (i.e., prompt) evoked the response in absence of the tact condition (i.e., liking). As discussed in the previous section on prompting, terminal controlling conditions should be established before the prompt.

In many academic settings, tacts or labels are taught as part of the curriculum. For example, the learner might need to show that he or she has mastered labeling colors or the months of the year. There are two considerations worth mentioning here. First, we would want the learner to master the names of items before teaching the properties of those items. For example, we would make sure that the learner could label a ball before teaching him or her the color of the ball. Second, when we check knowledge with questions, we are bringing an intraverbal element into the instruction (see below). Many learners are able to label colors but have trouble discriminating which answer to give if asked "What's this?" versus "What color?" Whereas the primary stimulus control for the tact is the presence of the item, the intraverbal component is the question word. Asking for and commenting on things in the immediate environment make up a large part of the communication of early learners.

Echoic. SLPs might refer to *echoic* responding as *verbal imitation*. The primary antecedent to an echoic is a spoken response by another person. The echoic behavior itself closely matches what was said by the other person. In addition, the echoic is the only verbal operant that specifies communication modality. Specifically, echoics must be emitted via speech rather than through some form of AAC. (Similar responses through AAC might be described as motor imitation in behavior analytic terms.) Although echoics might not appear immediately relevant to AAC teams,

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it is important that speech and echoic shaping are not completely neglected in favor of instruction solely focused on AAC for learners who do not yet talk. In fact, treatment options are available to target skill deficits in speech while instruction proceeds on AAC (e.g., Esch, Carr, & Grow, 2009; Koehler-Platten, Grow, Schulze, & Bertone, 2013; Tsiouri, Schoen Simmons, & Paul, 2012). Moreover, studies show that instruction in some AAC modalities may improve vocalizations (Millar, Light, & Schlosser, 2006), so it is possible that AAC instruction might result in echoic responding to the device. Assessing and developing targets for speech shaping are areas in which SLPs often have more specialized training than BAs, so the SLP's input is particularly valuable in echoic programming.

Like a tact, the consequence to an echoic is nonspecific social attention. For example, a parent might smother an infant in kisses for echoing "dada" or "mama." Please note that the echolalia often observed in children diagnosed with autism spectrum disorder may or may not be considered a true echoic. If the echolalia is delayed (e.g., scripting something mom said yesterday rather than what was just heard) or the learner is not motivated for some form of social interaction (e.g., echolalia occurs whether or not another person attends to the learner), then the learner's response would not be considered an echoic in behavior analytic terms.

Intraverbal. The final elementary verbal operant discussed here is the *intraverbal*, which is commonly described as answering questions or informing. Like an echoic, the antecedent to an intraverbal is the verbal response of another person. However, unlike the echoic, this antecedent does not have to be spoken (e.g., can be sign language), and the intraverbal response itself does not closely match what was said by the communication partner. The consequence to an intraverbal is nonspecific social attention.

Early occurring intraverbals often include song fill-ins, animal sounds, and other fun fill-ins (e.g., The wheels on the bus go…*round and round*; A cat says…*meow*; Ready, set,…*go*). More complex intraverbals related to responding to questions or making comments about past or future events typically do not occur until a developmental age of around 3 or 4 years. It is important that learners have a strong tact repertoire before they begin responding to questions about items and events not present in their immediate environments. Otherwise, instructors may inadvertently train rote intraverbal responses that have no true meaning for the learner. Pragmatic functions that may describe intraverbals include answering, informing, relating information, and telling stories.

From a behavioral perspective, conversations are mostly considered to be a combination of mands for information (i.e., asking questions) and complex intraverbals (i.e., answering questions and relating information about events not present). Therefore, BAs might focus on building a rich repertoire in simpler verbal operants before expecting learners to effectively hold flexible and natural conversations.

Response Effort

A particularly important variable for AAC teams to consider is the modality of communication that will be selected for a given learner. As described above, communication modality is the specific response form a learner will be taught to use, such as speech, sign language, picture exchange, or a speech-generating device. A complete communication evaluation and comprehensive AAC assessment will allow teams to best match an AAC system to the child. One relevant variable to AAC modality selection is *response effort*. Response effort is "the amount of force, exertion, or time involved in executing a response. With an increase in response effort for one behavior, the probability of that behavior decreases relative to the probability of a functionally equivalent alternative behavior" (Miltenberger, 2001, p. 497). The main factor that influences response effort of an AAC system is a learner's unique set of baseline skills as matched to that system.

As will be discussed in a later section, before learning functional communication, individuals with disabilities may have already acquired many maladaptive behaviors that get the same needs met but are unsafe or inhibitory in the long run. To counterbalance this long

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learning history, AAC teams need to ensure that the communication responses they are teaching are much easier than the responses the learner is already emitting. For example, if a child has learned that banging his or her head against the refrigerator door results in delivery of his or her favorite juice, the AAC team will need to select a communication modality that allows the child to access juice quicker and more easily than banging his or her head. Although not all communicative behaviors are as severe as head banging (nor are they always maladaptive), learners have often acquired some very quick and effective responses to get their needs met that the AAC team may wish to replace. These responses can include reaching, grabbing, pointing, climbing, screaming, whining, and many more. As Miltenberger (2001) indicated, any responses that are more effortful than what has already been acquired will not in fact replace the previously acquired responses in a significant way. Therefore, response effort is a critical factor, albeit not the only factor, to consider in determining the best mode of communication for a particular child. Let us say a child has learned to bang his or her head on the refrigerator to gain access to his or her juice. If, instead, we attempt to teach him or her to find his or her device, turn it on, and then find the page where "juice" can be activated, the response effort involved is considerably more than banging his or her head on the fridge and so is not likely to effectively replace head banging.

Key Consequence Factors

There are many behavior analytic variables related to consequences, but three key variables are particularly important for AAC teams to consider. One of the most critical consequences in AAC instruction (and any instruction, for that matter) is reinforcement, so this principle will be reviewed first. After the discussion of reinforcement, the related concept of behavioral function will be examined. Finally, punishment will be addressed.

Reinforcement

BAs recognize *reinforcement* as the only means by which new skills can be learned, which should make it a primary focus of AAC teams. Newman et al. (2003) defined reinforcement as "a consequence that increases the future probability of the behavior that preceded it" (p. 95). Responses or behaviors are reinforced, not people. A *reinforcer* is the stimulus that, when presented after a response, increases the response's future probability. Reinforcers are highly individualized and can be variable. The same event that served as a reinforcer for one response in one moment may not serve as a reinforcer for another response or at another time. Reinforcement is a process, not an item. It refers to the effects of a stimulus on a behavior, not the stimulus itself. Team members cannot determine if they have reinforced a response until they track its future occurrence.

Reinforcement always increases the future probability of behavior, no matter the word tacked onto it. Within the science of applied behavior analysis, positive reinforcement and negative reinforcement are defined based on a mathematical calculation (i.e., plus or minus), rather than as an appraisal of value (i.e., good or bad). *Positive reinforcement* increases the future probability of behavior by adding something to the environment. Praise, tangible items, or social interaction may serve as positive reinforcers, as could spankings and reprimands. All of these consequences add something to the environment that was not present previously. They all may be positive reinforcers if each of their effects is to increase the behavior they follow in the future. For example, consider a situation in which a learner throws his or her iPad at the teacher and the teacher returns the iPad while saying, "It's not nice to throw things at people." If the learner throws the iPad again, the teacher's reprimand positively reinforced this behavior. Like positive reinforcement, *negative reinforcement* increases the future probability of behavior, but it does so by removing something from the environment. Muting a loud alarm, dimming bright lights, avoiding interaction with a particular person, and escaping task demands (e.g., time-out) may be negative reinforcers, depending on their future effects on the behaviors they follow. With these consequences, something is removed (or avoided) in the environment. Continuing the aforementioned example of the learner with the iPad, suppose the learner throws his or her iPad at the teacher but, this time, the teacher backs away from the learner and removes the iPad and

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the work the learner was required to complete. If the learner throws the iPad again, the removal of instruction, the iPad, and the teacher negatively reinforced this behavior.

A final point to consider regarding reinforcement is its intimate link to motivation. As discussed earlier, motivation alters the value of a stimulus, namely, a reinforcer. Thus, depravation, satiation, and other changes in conditions impact the effectiveness of a given reinforcer at any moment. In AAC instruction, if motivation is not established, neither is a reinforcer. If a reinforcer is not established, communication and related responses cannot be learned. If communication is not learned, the AAC team is not providing a therapeutic environment. No person learns to communicate without motivation and reinforcement. In other words, providing exposure or access to an AAC system without developing clear procedures to establish motivation and reinforcement would not be instruction.

Functions of Behavior

As mentioned, BAs consider reinforcement to be the only way to increase the future probability of a learned behavior. Therefore, if a learner's use of an AAC system is increasing, something is reinforcing those AAC responses. However, reinforcement does not discriminate. It does not only increase desired behaviors. Rather, reinforcement increases the probability of any response it follows. Consider an example in which a child wants parent attention, the child shouts a swear word, and the parent reprimands the child. Because of positive reinforcement (i.e., onset of parent attention), this child will be more likely to shout a swear word in the future when motivated for attention. From a behavioral standpoint, *function* refers to the specific relationship between a response and the consequence that is reinforcing it (Miltenberger, 2001). The function of swearing in the above scenario would be to gain the parent's attention.

In behavior analysis, functions of behavior can be categorized along four functional *response classes*. It might be helpful to visualize these response classes as bottomless buckets in which most learned behaviors can be dropped, stored, and selected. Using this analogy, previously learned responses never truly leave the bucket and may reemerge any time that a more recently learned response is ineffective. Reinforcing previously learned responses strengthens them or puts them on the top of the bucket. This could be problematic if the reinforced responses are maladaptive. Thus, any reinforcement of new, adaptive responses within a response class also requires not reinforcing older, maladaptive responses. The less reinforcement of maladaptive responses, the further these responses sink in the bucket and the less likely they will reemerge. The four response classes will be discussed in the following sections, including examples of their relevance to communication instruction. Two of the four response classes serve the function of communication.

Socially mediated positive reinforcement. One functional response class includes behaviors that serve the function of accessing something from someone else, a function known as *socially mediated positive reinforcement*. Throughout our lives, many different behaviors have resulted in attention, items, or events being delivered to us by someone else. As babies, we cried. When we cried, we may have been picked up, rocked, or fed. Eventually, we learned to differentiate our cries. The "hungry cry" sounded different from the "pick me up cry." We also may have learned that smiling got our caregivers' attentions. As we grew, we added gestures, reaching, pointing, and grabbing to this bucket. Finally, we learned to say sounds and words to get people to deliver things to us. However, if we asked our parents for something and that item was denied, we may have pulled behaviors like crying back out of the bucket because they worked for us in the past.

The response class of socially mediated positive reinforcement largely represents the function of communication. In other words, most of the time, we communicate because we want more attention from or interaction with another person. This was alluded to in the discussion on verbal operants. The consequences for tacts, echoics, and intraverbals always involve increased interaction and attention from someone else. The only elementary verbal operant that may sometimes result in the removal of attention is the mand. The response class that results in this removal of attention will be discussed in the next section.

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Socially mediated negative reinforcement. The bucket representing *socially mediated negative reinforcement* contains all of the behaviors we have learned that helped us escape or avoid other people and the demands or stimuli they presented to us. As babies, we may have arched our backs if we wanted to be put down. We may have turned away, looked away, or hid our faces to escape or avoid an unwanted social interaction. When we started gesturing, we may have learned to push or swipe away things that were presented to us that we did not want. We likely learned the word "no" as one of our first words. As we grew, we learned to communicate "no" in more sophisticated ways. We might have asked when we could be finished or how much longer we had to engage in a nonpreferred task. However, if those sophisticated words did not affect the listener in the desired way, we may have reverted to responses such as swiping or hiding.

Socially mediated negative reinforcement is the second function that communication can serve. Although communicating to escape people should be less frequent than communicating to gain interaction with people, refusal is a critical part of communication training. Saying "no" or "I don't want to" is a human right (Brady et al., 2016), and teaching acceptable ways to emit this response might reduce wasted instructional time in the long run. Instructors may be concerned that teaching a child to say "no" will increase his or her probability of avoiding or leaving instruction in the future. However, this concern becomes less plausible when examining the critical link between motivation and reinforcement. Specifically, escape from instruction is only an effective reinforcer when the value of escape is high. Research shows that learners are most often motivated to escape instruction for the following reasons: (a) It is too difficult, (b) it is too slow, (c) it is not fun or reinforcing enough, (d) it is too repetitive, and (e) it results in too many errors (Carbone, Morgenstern, Zecchin-Tirri, & Kolberg, 2010). Thus, when a learner indicates that he or she is motivated to escape instruction, it is the instructor's job to change instruction in a way that weakens the value of escape as a reinforcer. The instructor might make tasks easier, reinforce more frequently, mix and vary task demands, and/or find stronger positive reinforcers, for example. In the end, when an instructor has made a mistake and accidentally increased the value of escape, it is safer and wastes less time for the learner to tell the instructor "no" rather than to engage in less adaptive responses.

Automatic positive reinforcement. A third, noncommunicative response class involves responses that produce their own reinforcement by providing desired sensory stimulation. This response class is called *automatic positive reinforcement*, commonly known as *self-stimulatory behaviors* when referring to atypical responses within this class. As babies, we may have learned to coo and babble or play with our fingers and toes, and we may have engaged in these behaviors even when no other people were around. As we aged, we may have learned to twirl our hair, tap our fingers on the table, read a book, go on roller-coaster rides, and listen to music. We may also have learned similar behaviors that acted on the nonsocial environment outside our bodies, such as pressing a button on a remote control to turn on the television, playing a video game, and knitting.

Just like typically developing individuals, AAC users may engage in a variety of responses that serve the function of automatic positive reinforcement, although these responses may not always take common forms. For example, some individuals may take pleasure in the particular sounds or images emitted by their speech-generating devices. These individuals may repetitively press the buttons on their devices, not for communication purposes but to gain the desired sounds or images. Instructors can determine if button-pushing is communication or an automatically reinforcing behavior by examining the conditions for the response (i.e., Was motivation established for social interaction?) and/or by delivering what was requested (if the response was a request) and observing the learner's reaction. For example, if delivering the requested stimulus results in a learner pushing it away or showing no observable reaction to it, the button-pushing response was not likely communicative.

By definition, the more an individual engages in behaviors reinforced by automatic positive reinforcement, the more likely he or she will be to engage in them in the future. The danger of

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engaging in these responses is that they make a learner less available to emit social responses such as communication. Blocking the response may be difficult but is important, as the only way to not reinforce the response is to block the response itself. It should be noted that self-stimulatory behavior is different from *exploring*. Exploring typically comprises a number of different behaviors (some of which may be social) involving a number of different and novel stimuli, resulting in different and novel consequences. If a learner repeatedly engages in the same responses that gain the same nonsocial consequences, these responses would be self-stimulatory and not exploratory.

Automatic negative reinforcement. The final response class, known as *automatic negative reinforcement*, involves all the behaviors that are used to avoid or escape uncomfortable sensory stimulation that is nonsocial. Many everyday adaptive behaviors serve this function (e.g., scratching an itch, taking medicine for a headache, putting on a coat before walking out the door in the winter, wearing sunglasses on a sunny day, opening an umbrella on a rainy day, or using an oven mitt to remove a pan from the oven). Less adaptive behaviors that may serve the function of automatic negative reinforcement include addictions, compulsive behaviors, and some sensory defensive behaviors. Common interventions for maladaptive behaviors in this response class are systematic desensitization (e.g., Koegel, Openden, & Koegel, 2004) and medical attention.

While a desensitization program is in its early stages, intervention teams may provide the learner with protective gear, such as sunglasses or headphones, if the environment is one not yet addressed in desensitization. The team may also teach the learner to communicate what is bothering him or her and ask for assistance. This communication may replace the maladaptive behavior serving the function of automatic negative reinforcement with an adaptive behavior serving a social function. For example, a learner may forcefully squeeze and pound his or her head to remove or distract from a headache (i.e., automatic negative reinforcement). However, the team may recognize precursor behaviors (e.g., rocking) and prompt the learner to emit "Headache. Need medicine" on his or her AAC device when he or she is rocking. In this case, the mand for medicine results in the delivery of medicine, which is socially mediated positive reinforcement.

Punishment

Punishment is any consequence that decreases the future probability of the behavior that precedes it (Newman et al., 2003). Similar to reinforcement, *positive punishment* and *negative punishment* occur when a stimulus is added to or removed from the environment, respectively, that decreases the future probability of behavior. Punishment is common in everyday life. Touching a hot stove and getting burned, eating spoiled food and feeling sick, and receiving a speeding ticket are all examples of consequences that may be punishing.

Punishment is not a common procedure within behavior analysis. Instead, combination interventions containing (a) reinforcement of replacement behaviors and (b) extinction of maladaptive behaviors are typically the first steps to ameliorating problems. *Extinction* occurs when reinforcement stops and the behavior fades. In other words, the behavior no longer "works" for the learner. For example, if a child previously learned that he or she could gain access to juice by banging his or her head on the refrigerator door, the team would never allow the child access to juice after head banging in the future, and signing, saying, handing over a picture, or pushing "juice" on a speech-generating device would be taught to replace the behavior. Simply stopping reinforcement of maladaptive behaviors is often a very effective and much milder approach than the nonpreferred stimuli involved in punishment procedures. However, a predictable, immediate effect of extinction is an *extinction burst*, a temporary increase in the frequency, duration, and/or magnitude of the behavior before it begins to fade. Occasionally, extinction bursts result in maladaptive behaviors that are so severe that they render the learner and/or others unsafe. In these cases, extinction procedures are contraindicated.

Within behavior analysis, punishment procedures are considered a last resort. They are only implemented when procedures involving reinforcement alone are unsuccessful and the

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behavior of concern poses a significant threat to the safety of the learner and/or others. Even then, punishment procedures are accompanied by reinforcement of alternative behaviors, they require increased training and supervision of those carrying out the procedures, and they include a systematic plan for discontinuing the procedures as soon as possible. These guidelines are outlined in the Behavior Analyst Certification Board, Inc.'s (2014) professional and ethical compliance code for BAs.

Conclusions

True to ASHA's (n.d.) commitment to IPE and IPP, this article clarified key terms related to behavior analytic principles and practices for SLPs collaborating with BAs on AAC teams. It also illuminated ways that these principles and practices may improve AAC intervention. Although some of the described behavioral principles differ from those in speech-language pathology, some are in fact present in speech-language pathology under different names (e.g., conditioned motivation [environmental sabotage]), and others appear to have similar meanings in both fields (e.g., functional communication). When interprofessional team members are open to learning from and teaching one another, they may realize that terminology and conceptual barriers are not insurmountable. Productive, collaborative relationships start with open and respectful communication and IPE. In the end, successful collaboration stands to benefit all parties involved. It fosters professional growth and results in the best outcomes for the individuals served.

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Appendix. Key Terms

Antecedent	Environmental event that occurs before a response and occasions it. Example: Child sees a cow and is motivated to call another person's attention to it.
Autoclitic	A verbal behavior that modifies the function of other verbal behaviors. Example: *I think* it's about to rain.
Automatic negative reinforcement	Functional response class containing responses that are used to escape or avoid uncomfortable sensory stimulation. Example: taking an aspirin when one has a headache or pushing a button on a device to block out unpleasant sounds.
Automatic positive reinforcement/self-stimulatory behaviors	Functional response class containing responses that produce their own reinforcement by providing desired sensory stimulation. Example: pushing "hippo" over and over on an SGD because the child enjoys the sound.
Behavior/response	What a person does; must be observable and measurable by the individual or others. Example: saying "cookie," thinking about a cookie, signing "cookie," or pushing a button that emits "cookie."
Conditioned motivation	Motivation established by pairing stimuli or withholding or pausing a critical stimulus required for a task. Example: using toys with the child's favorite TV character to increase the likelihood that the child will play with the toy. Or, child is motivated to go outside and shoes are required so the value of communicating "shoes" is temporarily increased.
Consequence	Environmental event that occurs after a response and determines its future probability. Example: When a child gets to go outside after pressing "outside" on a device, this increases the likelihood that he or she will press "outside" the next time motivation is present.
Contingency-specifying stimulus	Verbal, visual, or written response that specifies the relationship between a behavior and its consequence, also referred to as a *verbal rule*. Example: social narrative describing possible results of asking for a break when work is difficult.
Deprivation	Depleting or limiting a reinforcer, increasing its value. Example: A child has not played with a preferred toy in a while.
Discrimination training	Procedure in which a response is regularly reinforced in the presence of a stimulus and not in its absence; results in stimulus control. Example: When a cow is present, pressing "look cow" is reinforced but pressing "look bus" is not.
Discriminative stimulus	Antecedent that occasions a particular response in its presence and terminates a response in its removal or absence. Example: Pressing "look cow" only happens when a cow is present.
Echoic	Verbal operant; antecedent involves listener speech, behavior matches listener speech closely, and consequence is nonspecific social attention. Must be spoken. Common term: *verbal imitation*. Example: Mom says "juice"; child says "juice."

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Environmental sabotage	Withholding or pausing critical stimuli necessary to access or complete a preferred task. Example: giving the child a picture to color but no crayons.
Exploring	Engaging in a variety of different responses with different, novel stimuli that result in different, novel consequences. Example: having a new toy and turning and pushing different parts to see how it works.
Extinction	When reinforcement stops and behavior fades. Example: One stops putting money into a soda machine if the machine does not deliver a soda.
Extinction burst	Predictable, immediate increase in the frequency, duration, and/or magnitude of a behavior after cessation of reinforcement. Example: One shakes the soda machine or pounds on the button if the machine does not deliver a soda.
Function	Relationship between a response and the consequence reinforcing it. Example: A child bangs his or her head on the fridge because, in the past, someone has opened the fridge and allowed him or her access to juice.
Functional communication	Communication understood by all communication partners; alternatively, communication taught under similar conditions that occasion it for other people in the surrounding community. Example: Child says, “This is too hard,” and the adult in the environment knows to change the difficulty level.
Intraverbal	Verbal operant; antecedent involves listener verbal response, behavior does not match the listener response closely, and consequence is nonspecific social attention. Common terms: *answering questions; informing*. Example: answering “What color is the sun?” or “What did you do last weekend?” (item discussed is not present).
Mand	Verbal operant; antecedent involves motivation for a specific reinforcer, and consequence is direct reinforcement. Common term: *request*. Example: Child says, “Where’s my jacket?” and adult tells the location.
Motivation	Antecedent that alters the value of a reinforcer and influences the likelihood of any response that might access it. Example: Child is motivated to gain attention from an adult, so child walks up and says “Hi!”
Negative punishment	Consequence that decreases the future probability of behavior by removing something from the environment. Example: Two children are fighting over a toy, and the toy is removed from the environment and decreases fighting over the toy in the future.
Negative reinforcement	Consequence that increases the future probability of behavior by removing something from the environment. Example: Child is in circle time and hits the child next to him. He’s removed from the circle. The next time he’s in the circle, he hits the child next to him again.
Positive punishment	Consequence that decreases the future probability of behavior by adding something to the environment. Example: Child yells at his parent, and parent requires him to rake the yard as a consequence. The yelling behavior reduces in the future.

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Positive reinforcement	Consequence that increases the future probability of behavior by adding something to the environment. Example: Child asks for help on an assignment, and adult gives help. Asking for help increases in the future.
Pragmatic function	The intended purpose of a communication response within a social situation. Compare with *verbal operant*. Example: saying "I don't want to do this" when motivated to escape or avoid a particular activity.
Prompt	Added stimulus to the antecedent condition that reliably evokes a target behavior; often an already established skill. Compare with *scaffolding.* Example: pointing to a picture of a button that results in the child touching the button. Giving the fill-in "We roll the….," and the child presses "ball" on a device when the goal is to teach the child to ask for a ball.
Punishment	Consequence that decreases the future probability of the behavior it follows. Example: Child hits and is put in time-out, and hitting is reduced in the future.
Reinforcement	Consequence that increases the future probability of the behavior it follows. Example: Child says "bounce," and adult immediately bounces the child on his or her knee, so child says "bounce" next time he or she is motivated to bounce.
Reinforcer	Stimulus that increases the future probability of the response it follows. Example: smiles, pats on the back, praise, food items, escaping, avoiding. Whatever results in an increase in the target behavior for a particular child/person.
Response class	Category of responses that all serve the same function. Example: all the behaviors a person has learned to use gain access to favorite things or activities.
Response effort	Amount of force, exertion, or time involved in emitting a response. Example: Manipulating through three pages on a device to find a desired item requires much more effort than having the item on the page in front of you.
Satiation	Engorgement on or repeated exposure to a reinforcer, decreasing its value. Example: If the child has been playing with a favorite toy all day, he or she will be less likely to want to play with it with the SLP.
Scaffolding	Process in which established skills are used to guide new skills. Compare with *prompt*. Example: providing a rubric for retelling a past event and fading out the use of the rubric over time so the child can retell independently.
Socially mediated negative reinforcement	Functional response class containing responses reinforced by escape or avoidance of instructional demands, another person, or stimuli delivered by another person. Secondary function of communication. Example: saying "I don't want to do this," swiping materials off the table, or running away from the class because of a learning history of each of the behaviors resulting in escape or avoidance of class work in the past.

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Socially mediated positive reinforcement	Functional response class containing responses reinforced by delivery of attention, items, and/or events by another person. Primary function of communication. Example: tapping an arm, yelling at another child, taking a toy, or saying someone's name because each of the behaviors has resulted in gaining an adult's attention in the past.
Stimulus	Anything in the environment that can be discerned by the senses. Example: seeing a beautiful bird, hearing a sound, or feeling the bark of a tree.
Stimulus control	Occurs when a response is reliably occasioned in the presence of an antecedent stimulus and not in its absence; the result of discrimination training. Example: Child says "Look at the red bird!" only when a bird is present and that bird is red, but not when a cat is present or the bird is blue.
Tact	Verbal operant with an antecedent of nonverbal, sensory stimulus; consequence is nonspecific social attention. Common term: *label*. Example: saying "fire truck!" when the child hears a siren in the distance and adult says "Yes! I hear the fire truck!"
Three-term contingency	Unit of analysis that consists of antecedents, behaviors, and consequences; the fundamental framework of behavior analysis. Example: A, motivated to go outside and adult is present; B, can I go outside?; C, yes, you may go outside.
Verbal operant	Communication behavior analyzed and categorized based on how it serves the speaker by Skinner (1957) according to unique antecedents and/or consequences. Compare with *pragmatic function*. Example: mands, echoics, tacts, and intraverbals.

Note. SGD = speech-generating device; SLP = speech-language pathologist.

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