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Tutorial

Promoting Conditional Use of Communication Skills for Learners With Complex Communication Needs: A Tutorial

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Purpose: Conditional use of communication skills refers to the ability of a learner to appropriately generalize and discriminate when, where, and how to communicate based on constant variation and shifts in environmental cues.
Method: We describe discrimination and generalization challenges encountered by learners with complex communication needs and ways in which these challenges are fostered through traditional communication intervention programming. We address arrangements in instruction that maximize the probability of learners acquiring the conditional use of new vocabulary and the modest instructional technology implemented when planning for generalization.
Results: We propose establishing well-discriminated and generalized use of new vocabulary items through the application of a general case instruction framework to communication intervention programming.
Conclusion: We provide intervention methodology, including intervention steps for general case instruction, a plethora of functional examples, and graphic displays to assess and intervene to promote conditional use of communication skills for learners with complex communication needs.

For many learners with significant intellectual and/or neurodevelopmental disabilities and basic communication skills (herein referred to as learners with complex communication needs [CCNs] or, simply, learners), both vocabulary acquisition and appropriate discrimination and generalization of these skills may not occur without systematic intervention (Calculator, 1988; Johnston, Reichle, Feeley, & Jones, 2012; Light, 1997; Light, Roberts, Dimarco, & Greiner, 1998). Competent communicators must become conversant with the conditions that are important in determining when they should and should not produce a communicative response. Learning when to and when not to produce a communicative behavior is referred to as conditional use. Examples are numerous when we communicate with others. For example, we talk to friends using different interactional styles than we do with strangers. In interacting with young children (i.e., 2-year-olds), we use a smaller vocabulary range, talk slower, and use simplified syntax than we do when we talk to older children (i.e., 4-year-olds). With respect to vocabulary use, we refer to red, green, yellow, big, and small apples as apples, whereas at the same time, we refrain from using the word *apple* to refer to a green, yellow, big, or little pear. Professionally, many interventionists encounter learners who have not learned to discriminate between the environmental cues (i.e., antecedent stimuli) that support the use of a specific vocabulary item. For example, a learner who acquires sufficient language to request a candy bar may not only correctly request one at a local movie cinema but also inappropriately request one during independent math time at school.

Technically, conditional use of communication refers to "the ability to discriminate among the specific stimulus conditions that should and should not result in a communicative utterance" (Reichle & Johnston, 1999, p. 324). Conditional communicative production is a crucial area in intervention planning for learners with CCNs (Reichle & Wilkinson, 2012). Persons who have significant communicative challenges often have difficulty conditionally using newly acquired communication skills (Horner

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& Albin, 1988; Johnston et al., 2012; Reichle, Rogers, & Barrett, 1984). Consequently, this article will address issues and challenges related to conditional communication skills that have not been adequately addressed in providing early communication intervention. Specifically, after a brief overview of general case instruction, we will address (a) the role of conditional use in communication intervention, (b) discrimination and generalization challenges for learners with CCNs, (c) the role of stimulus control in conditional use, and (d) intervention strategies for promoting stimulus generalization and optimizing condition use.

General Case Instruction

General case instruction (Horner & McDonald, 1982; O'Neill & Reichle, 1993; Reichle & Johnston, 1999) is a framework that allows the design of interventions that promotes the generalized use of communication skills during early/acquisition stage of intervention as part of the acquisition process rather than considering generalization after skills have been acquired (Johnston et al., 2012). Typically, general case instruction involves six steps that include (a) defining the instructional universe: different environmental cues and events occurring before a communicative act that allow the learner to discriminate when and when not to produce a given communicative act; (b) defining the communication skills that have been or will be taught that will constitute the communicative acts for events described in (a); (c) determining when the communicative act being taught should be used (i.e., positive teaching examples) and when to refrain from using the act being taught (i.e., negative teaching examples); (d) determining how to sequence the teaching examples; (e) identifying the teaching examples; and (f) probing for generalization of the communication skill in situations where the target behavior should and should not be used.

Several examples where conditional use has been integrated into communication intervention include studies conducted by Kuhn, Chirighin, and Zelenka (2010) and Leon, Hausman, Kahng, and Becraft (2010). To teach the conditional use of requesting attention, Kuhn et al. selected six contexts in which the interventionist would appear busy (e.g., interventionist talking on the phone) and six contexts in which the interventionist would appear not busy. One participant was taught to approach and ask "are you busy?" before requesting attention or forgoing requesting attention. Learners were taught via modeling with one interventionist engaged in a busy or not-busy context and the other interventionist (the model) asking "are you busy?" and then either asking for attention or walking away depending on the answer. With a similar intervention, both participants in the Kuhn et al. study acquired the conditional requests for attention and generalized appropriately to most of the untaught busy and not-busy contexts. There are also other notable studies in which learners were taught whether to request assistance with tasks based on the proximity of task materials utilized (i.e., Reichle & Johnston, 1999) or the difficulty of the tasks (i.e., Reichle, Byiers, & Reeve, 2016; Reichle, Dropik, Alden-Anderson, & Haley, 2008).

To teach conditional use of requests for snack foods, Reichle and Johnston (1999) selected multiple contexts representing when to use a communication request for snacks (i.e., snacks were out of reach of the learners) and when to only take a snack without requesting (i.e., snacks were within the learner's reach). Two examples of each context (within reach and outside of reach) were selected for each learner. To get access to the snack, the participant requested using a 2-D graphic symbol only when the snacks were out of reach. Alternatively, learners were taught to independently select the snack item (without requesting) when it was within reach. The teacher began by providing opportunities in which the antecedent stimuli associated with when to independently select and when to request access (i.e., the proximity of the snack to the participant) were maximally different (i.e., the snack was very far from or close to the participant). As the participant conditionally used the targeted graphic exchange requests, the proximity was decreased. During early components of intervention, physical prompts were used to ensure that learners were in contact with target symbols and refrained from contacting the target symbol when they should refrain from making a request. Correspondingly, when the learner should independently access snack items, partial physical prompts were used, although typically learners were already accessing materials independently.

Available literature suggests, however, that, instead of concurrently addressing both when and when not to produce a new communicative response during acquisition (conditional use), interventionists tend to pursue a sequential approach to generalization in which the interventionist teaches the learner when to use the targeted communication response and then hopes that the learner will use it when he or she should and refrains from using it in inappropriate situations. Often, this approach results in insufficient generalized conditional use (Calculator, 1988; O'Neill & Reichle, 1993; Schlosser & Lee, 2000).

When generalization is evaluated during or after acquisition, it typically is done across novel contexts or cues that call for the newly established skill. However, generalization probes rarely include examples of the "nonuse" of the newly taught skill. Instead, interventionists often assume that a learner will infer when and when not to use the new skill. For example, if a learner is taught to request assistance during a difficult task but also requests assistance during tasks he or she can complete independently, the learner has overgeneralized the skill. In contrast, failing to request assistance during other difficult tasks and only during the instructional task constitutes undergeneralized skill use. Given that error patterns among learners with CCNs may include both undergeneralization and overgeneralization (Reichle et al., 1999; Schlosser & Sigafoos, 2002), optimal intervention should include a comprehensive evaluation.

Simple and Conditional Discrimination

Simple Discriminations

In a simple discrimination, the learner must decide only whether to produce or not produce a behavior (a "go"/"no-go" discrimination). For example, one of the participants with Rett syndrome and severe communicative delay in the study by Simacek, Dimian, and McComas (2017) was taught to select a single general symbol to produce requests for desirable items and parental attention. The learner needed only to select or refrain from selecting the symbol; therefore, there was not a "no" or "I don't want" symbol in the presence of nonpreferred items that was taught concurrently. In general, the functional communication intervention literature provides numerous examples of teaching simple communicative responses that we have just described (Byiers, Dimian, & Symons, 2014; Keen, Sigafoos, & Woodyatt, 2001; Tait, Sigafoos, Woodyatt, O'Reilly, & Lancioni, 2004). In Simacek et al., it is likely that reinforcement history dictated the learner's symbol use. When food associated with symbol selection was available, the learner touched the symbol regardless of the status of the listener and did not touch the symbol when those items were unavailable. In these simple discriminations, the learner is not required to communicate between appropriate use and nonuse of a variety of different symbols.

Conditional Discrimination

In contrast, in a conditional discrimination, the contingencies covary with the presence of a specific discriminative stimulus (Andrews, Halford, & Boyce, 2012; Axe, 2008; Catania, 1998). Communication that involves a conditional discrimination occurs when the learner varies his or her responding (including responding, not responding, and different responses matched to uniquely different situations) based on the presence of a set of different cues that are present or not present for each of a variety of different symbols. For example, the learner would need to use the symbol "pear" in response to an actual pear and refrain from using the symbol for pear to represent an irrelevant referent (e.g., apple). Concurrently, the learner would need to be able to use the symbol representing apple when referring to an apple, but not other types of fruit. Correspondingly, realizing that fruit can be requested during snack time but not typically while one is brushing his or her teeth represents an additional aspect of a conditional discrimination.

Generally, engaging in simple discriminations represents a pivotal skill in mastering conditional discriminations. As a higher-order skill, conditional discriminations are essential to the acquisition of numerous adaptive skills (Orr & Mast, 2014; Reichle & Wilkinson, 2012), including communication (Grow, Carr, Kodak, Jostad, & Kisamore, 2011; Ingvarsson & Hollobaugh, 2010; Miguel, Petursdottir, & Carr, 2005). For example, Ingvarsson and Hollobaugh (2010) taught four learners with autism spectrum disorder (ASD) to respond to unknown questions by requesting information. Importantly, the researchers also tracked the learners' use of this response to indicate whether it generalized to other unknown questions (i.e., appropriate generalization) and to questions for which the learner knew the answer, making a request for information unnecessary (i.e., overgeneralization). Each learner acquired the targeted request for information in the teaching context. However, only two of the learners demonstrated appropriate generalization and discrimination. For these learners, conditional use occurred as there was a gradual reduction in their queries as they began to learn the correct response to the previously unknown questions while they continued to produce correct responses to the previously known questions generated by a communicative partner. The remaining two learners required additional intervention to acquire conditional use of an informational request. This example illustrates the need for conditional use, as learners who were most efficient acquired a new communication response (requesting information), while at the same time managing, not overgeneralizing, the newly taught query.

Learners with CCNs often have difficulty with learning to concurrently discriminate and generalize (e.g., Haring, 1985; Horner, Dunlap, & Koegel, 1988; Joseph & Konrad, 2009; Turner, Dofny, & Dutka, 1994; Westling & Fox, 2004). Both are critically important in acquiring conditional communication use. Horner, Bellamy, and Colvin (1984) identified several aspects of generalization that can create challenges in acquiring conditionally used communication that include (a) irrelevant stimuli controlling the target response, (b) irrelevant stimuli controlling irrelevant responses, (c) restricted stimulus control sometimes referred to as stimulus overselectivity, and (d) limited variations of the target response. These difficulties can be parsed into two possible generalization error patterns that are likely to emerge in the absence of appropriate intervention. The first pattern occurs when the learner does not generalize skills across conditions. When this occurs, additional intervention is needed to teach the response with novel people, in novel environments, or in response to novel objects/events. In the second pattern, the learner spontaneously generalizes to novel conditions and frequently receives reinforcement for the new response in the natural environment. In this case, if intervention is not in place to teach the learner when refraining from the response, he or she may overproduce the response to inappropriate people, in inappropriate environments, or in response to inappropriate objects/activities. In a literature review related to generalization and natural language teaching, Peterson (2007) reported that naturalistic intervention procedures provided optimal generalization of natural language use; however, he reported that many of the included studies reported issues with generalization related to stimulus control. Clearly, tackling errors related to optimal generalization and stimulus control would provide helpful intervention support for learners who are encountering problems in these areas.

Irrelevant stimuli control the target response. When intervention results in new responses coming under control of irrelevant stimuli, a complex error pattern can occur where S+ conditions (those stimuli and antecedent events

that signal an opportunity to use a particular communicative response) that may also contain irrelevant stimuli can result in the production of the responses (Rincover & Koegel, 1975) as well as during inappropriate conditions that contain the irrelevant stimuli (Anderson & Spradlin, 1980; Sidman & Willson-Morris, 1974). At the same time, the response may fail to occur during what should be S+ conditions that do not contain the irrelevant stimuli (Rincover & Koegel, 1975). For example, an interventionist might teach a child to produce a request for "drink" only when the child is seated in a booster seat and not when the child is seated at the table or other locations. In this scenario, the child may not ask for a "drink" in scenarios without the booster seat (e.g., seated in a parent's lap at the table, at grandma's home, running in the heat outside).

Several groups of investigators (Horner et al., 1984; Rincover & Koegel, 1975) documented this pattern with children with ASD who were unintentionally taught that irrelevant furniture or interventionist cues served as discriminative stimuli that occasioned participation in simple spoken commands. The learners responded correctly when irrelevant stimuli were present but were not proficient responders when irrelevant stimuli were absent. Horner et al. (1984) gave another example of a student who learns that the discriminative stimulus for street crossing is someone else at the corner crossing the street (an irrelevant stimulus). Engelmann and Carnine (1982) attributed this control to intervention procedures that consistently pair responding in the presence of irrelevant stimuli with reinforcement. As Horner et al. (1984) pointed out, this error pattern can be avoided if multiple teaching examples are used that include both examples of when and when not to produce the response being taught (referred to as positive and negative teaching examples [which will be discussed later in detail as general case instruction]). For the former example of crossing the street, an interventionist could provide and reinforce responding during multiple positive and negative exemplars. The interventionist would provide multiple opportunities that do and do not include stimuli, such as other people at the corner crossing or crossing on different streets that have different features (e.g., crosswalk, stop sign, stop light) for the learner to cross or refrain from crossing the street.

Irrelevant stimuli controlling irrelevant responses. This error pattern occurs when a learner does not produce the response being taught because irrelevant stimuli are part of the learner's criteria for when to emit the response being taught. This most often occurs when the learner has a previous reinforcement history for producing a behavior that competes with the target response. For example, consider a learner who was taught to request root beer but only A&W® root beer in the distinctive can was delivered. To the learner, the logo for A&W must be present. Consequently, when he sees a different brand or a cup containing root beer, he fails to realize that root beer is available to be requested. This error pattern can be avoided by implementing multiple teaching exemplars to ensure that irrelevant stimuli will differ across learning opportunities. As a first step, the interventionist could affix a copy of the A&W symbol to different cups containing root beer, to help the learner to generalize the request. As the learner becomes successful with this, the interventionist systematically fades the use of the logos until they are no longer present.

"Restricted stimulus control" or stimulus overselectivity. This pattern occurs when a response that should be under the control of multiple relevant environmental features (stimuli) or multiple features of relevant stimuli is only controlled by a subset of those features. Stimulus overselectivity refers to an individual's tendency to identify only a limited number of stimuli as sharing critical features that make them variations of a target referent (Lovaas, Schreibman, Koegel, & Rehm, 1971). Persons with significant developmental disabilities who experience significant communicative challenges often select and respond to irrelevant stimuli and fail to respond to relevant stimuli (Lovaas, Koegel, & Schreibman, 1979). For example, if a learner is asked to touch a picture of an apple, he or she may select the apple because it is red, not because of other features, and therefore may generalize this response to pictures of red balls or even red stop signs. As with the previous examples, intervention with multiple exemplars and providing positive and negative exemplars may minimize the likelihood of developing this type of error.

Limited variations of the target response. This occurs when an individual does not have a sufficient response repertoire to select varied responses when presented with variations (even slight variations) on antecedent conditions (Horner et al., 1984). Some examples include speaking more loudly in a noisy area if your communication partner is on the opposite side of the room or tapping them on the shoulder to get their attention before communication, or specifying "orange juice" as opposed to saying "juice" when given the option of two different types of juice. This type of error pattern can be avoided by training for and reinforcing response variability (e.g., at times, when more than one juice is present, training the learner to provide a more detailed description to receive the type of juice he or she prefers).

Assessing a learner's mastery of discriminated communication. The first challenge in establishing conditional use of communication is determining whether a learner can discriminate between the specific visual appearance of graphic or gestural symbols and/or the sounds of spoken symbols to be used. This process can be easily illustrated with a learner who is being taught to use aided augmentative communication systems involving graphic symbols. Suppose, for example, that a learner, John, has an aided augmentative communication system containing multiple pictures that can be used to produce utterances about a range of different objects or activities. To effectively use this system, he must be able to discriminate between the specific graphic symbols to use specific symbols conditionally. If John can do this, the interventionist must then demonstrate that he is able (or will be taught) to link a

graphic representation to its corresponding referent. As mentioned previously, to do this, he must be exposed to the critical features that all relevant referents, to which the symbol can apply, have in common. Correspondingly, he must be able to recognize stimulus features that are not associated with the target item but may be critical in the identification of a second target item to which a different symbol will be linked.

To determine whether a learner can successfully engage in prerequisite simple discrimination skills, an interventionist might select three symbols. The interventionist would then place each symbol in front of John and encourage him to select one. Reinforcement would be provided regardless of the symbol selected. Next, the position of the symbols in the array would be randomized, and another opportunity would be offered. The symbol that was selected by the learner during the initial opportunity would be established as the criterion for a correct response. Across successive opportunities, the position of each choice in the array would be randomized and the selection of the same item (regardless of its position) would be reinforced. Selection of the same symbol across most opportunities would provide evidence that the learner can successfully engage in a simple discrimination. Once John consistently selected the same symbol, the interventionist could implement a reversal in which the symbol that had a history of being selected would no longer constitute the criterion for a correct selection. Instead, reinforcement would be offered for the selection of an alternative symbol. Typically developing children often shift responding based on reinforcement contingencies after the first or second opportunity in which reinforcement was not forthcoming. However, often, learners with CCNs persevere in their selection of the original symbol. This lack of flexibility in switching criterion may be one reason that some children have difficulty acquiring new vocabulary items as they are somewhat inflexible once a pattern of responding is established. Some have speculated that this is one reason some children may struggle in a matching-to-sample (MTS) task.

Strategies for minimizing the likelihood of discrimination error patterns. A summary of the many challenges with generalization and discrimination demonstrates the nuanced and complex nature of delivering a robust communication intervention. Using naturally occurring teaching opportunities, along with other elements of naturalistic language teaching procedures, may be an effective strategy for promoting generalization for many learners and avoiding generalization errors, as these procedures are consistent with many of Stokes and Baer's recommendations (e.g., Peterson, 2007). Naturalistic language teaching practices may promote communication intervention success and allow the interventionist to begin to identify whether generalization error patterns are developing so that corrective action to resolve these challenges can be implemented quickly. Solutions to minimize the generalization and discrimination challenges during intervention planning include contrasting positive and negative teaching exemplars using a general case instruction framework (Horner et al., 1984); planning for sufficient exemplars and intervening across settings and interventionists, which is also incorporated into general case instruction (Stokes & Baer, 1977); and addressing response variability during intervention (e.g., Lee, McComas, & Jawor, 2002). For example, one intervention strategy to increase response variability is using lag schedules of reinforcement (Lee et al., 2002). Lag schedules increase response variability by only reinforcing responses different from the previously reinforced response. For example, Ben earns poker chips contingent on greeting peers, which he can exchange for time watching videos on his tablet. With a lag schedule of reinforcement, the first time Ben greets a peer, he earns a poker chip for saying "hi." To receive reinforcement the next time he greets a peer, he needs to use a different greeting, so he may say "hey there." The lag schedule can continue until Ben is using several different greetings toward his peers. Lag schedules can be a mechanism to increase different response forms within a class of responses that can be used in the same or similar situations, within structured or natural learning opportunities.

However, just as naturalistic language teaching can help to identify and to challenge generalization early on in communication intervention, one drawback of using only naturally occurring opportunities (i.e., not contriving any opportunities) may be the dosage or the number of opportunities exposing the learner to different learning contexts. Therefore, integrating naturalistic language teaching into structured intervention paradigms can help to both identify and expose the learner to a variety of intervention contexts available in his or her natural environment while also increasing his or her exposure to a larger number of opportunities.

Considering the Role of Stimulus Control in Conditional Use

Stimulus Control and Motivational Operations

Stimulus control is a term used to explain the functional relationship between the presentation of an antecedent stimulus and a change in the probability of a response (Terrace, 1966). Among the types of antecedent stimuli are establishing operations (EOs) and discriminative stimuli. Originally, EOs were described by Keller and Schoenfeld (1950). Later, the terminology was improved by Michael (2000), who defined an EO as a stimulus, condition, or event that (a) momentarily alters the value of some stimulus as a reinforcer and (b) evokes all responses that are associated with that reinforcer in the past. He replaced the term *EO* with the terms *motivating operation* (MO), which can be described as stimuli that put the learner in a deprivation state where the reinforcer is highly effective, and *abolishing operation* (AO), which can be described as stimuli that put the learner in a satiation state, where the reinforcer is momentarily less effective. For example, if a learner is being taught to request for a teacher's attention, playing by oneself for the past 10 min constitutes an MO for an attention request in that there may be higher

effectiveness to the reinforcer of receiving attention from the teacher. Alternatively, playing with the teacher for an extended period may serve as an AO in that the learner has satiated teacher attention. MOs and AOs more accurately represent the bidirectional effects that reinforcement value can have on a learner's propensity to emit a response than the older "EO" terminology (Laraway, Snycerski, Michael, & Poling, 2003).

In contrast to MOs and AOs, a discriminative stimulus signals the availability of reinforcement contingent on the production of a specified response (e.g., Tiger, Hanley, & Heal, 2006) and is designated as S+ during teaching opportunities. A discriminative stimulus that signals unavailability of reinforcement is designated as S−.

MOs and discriminative stimuli exert stimulus control over responses. For example, in teaching a child to request access to a specific snack item during snack time, the length of time that has passed since the child last had access to the snack item (or other food in general) is one MO that is likely to affect whether the child produces the relevant request, with longer durations without food access likely serving to establish access to food as a stronger reinforcer (MO) and recent access to food serving to abolish access to food as a reinforcer (AO). In contrast, the presence or absence of food-related items, such as food containers, dishes, and so forth, may serve as discriminative stimuli if they have been reliably associated with the previous availability/unavailability of food in the past. Examples of discriminative stimuli and the influence of EOs and AOs are detailed in Table 1.

In natural environments, conditional use often requires a learner to discriminate between complex stimuli with a range of salient properties. As a result, it can be difficult to identify the full range of stimulus conditions that should or should not result in the production of a specific response. For example, consider a child who can get access to a preferred snack in one of two ways: by reaching for the snack independently or by asking an adult for assistance. To identify the best response in each situation, the child must consider a range of environmental features, including the distance between him or her and the snack, the location of the snack (i.e., a low table vs. on a high shelf), the presence of a listener to receive an assistance request, and the distance between that individual and the snack. The most efficient response will differ as a function of these features (and perhaps others). Given the complexity of the natural environment, it is likely impossible to create any instructional program that will incorporate all facets on which discriminative stimuli are likely to vary. As a result, it is important to consider not only the individual's ability to discriminate between stimuli but also the ability to generalize learned responses to novel stimulus conditions that include instances of when to use and when not to use a new response being taught.

Establishing conditional use with stimulus control. We begin with a relatively straightforward framework in discussing the role of stimulus control in establishing conditional use of communication. MTS has been customarily applied to teaching a range of conditional discrimination skills such as literacy, math, and social communication skills (e.g., Doughty & Saunders, 2009; Hammond, Hirt, & Hall, 2012; Kuhn et al., 2010; Sidman, 1971; Zaine, Domeniconi, & de Rose, 2014). MTS has proven to be an effective organizational framework in establishing conditional discriminations, particularly in beginning symbol acquisition investigations (see Murphy & Barnes-Holmes, 2010). An MTS opportunity starts with the presentation of a sample stimulus, followed by a response that utilizes the sample as an instructional cue in the selection of the best choice that matches the sample from an array of choice options. During initial intervention procedures, for each sample, only one choice is designated as the correct choice that will result in the delivery of positive reinforcement if selected (S+). The remaining comparison choices are designated as incorrect choices (S−), meaning that, if the learner selects any of these choices, he or she will not receive reinforcement. In a conditional discrimination (as mentioned earlier), S− stimuli are designated to become the sample during other instructional opportunities. During these opportunities, the S− becomes the S+. In other words, differential consequences are delivered and, at some point, during a session, where the correct choice is designated by the one that corresponds to the sample (Green & Saunders, 1998). This format can serve as the focal point of a discussion around conditional use and teaching conditional yet generalizable discriminations. MTS can be used in discrete trial teaching formats or more milieu (distributed) teaching formats. In the latter, for example, a learner might see another child eating a cookie (the cookie serves as a sample). The learner looks at the symbols (choices) on her communication board and selects the symbol representing "cookie." In a second application, the learner smells a cookie baking (sample) and selects the symbol choice cookie.

The role of prompts. In considering the implementation of specific instructional prompts, several general options can be considered in systematically eliminating them. Key instructional prompting strategies include (a) least-to-most prompting hierarchies, in which prompting begins with a least intrusive prompt and, if the learner is unsuccessful at the communication skill, increasingly more intrusive prompts are used (Repp, Karsh, & Lenz, 1990); (b) most-to-least prompting hierarchies, in which prompting begins with a most intrusive prompt and, if the learner is successful, increasingly less intrusive prompts are used (Libby, Weiss, Bancroft, & Ahearn, 2008); and (c) time delay, in which prompting is initially provided immediately and, progressively, the learner is given a short time to respond to a teaching exemplar before provision of a prompt (Charlop, Schreibman, & Thibodeau, 1985). Within a matching paradigm, useful prompting strategies include stimulus as well as response prompts. Although most interventionists are familiar with response prompting and fading response prompts, many are not familiar with stimulus prompts.

Table 1. Examples of some potential discriminative stimuli and motivating operations.

	Discriminative stimuli		Motivating operations	
Contextual example	**S+**	**S–**	**Establishing operations**	**Abolishing operations**
Teaching Ashley to produce a request to access pizza.	Presence of pizza on the table Dinnertime Walking into the pizza restaurant	Presence of a different (preferred) meal Breakfast time Walking into the ice cream shop	Ashley has not had a meal in several hours. Ashley has not had pizza in weeks.	Ashley just consumed a large meal. Ashley has had pizza every day this week.
Teaching Jacob to request for help to obtain desired items.	Preferred toy inside a container with a tight-fitting lid Preferred toy on a shelf where visible but out of Jacob's reach	Preferred toy inside an easily opened container Preferred toy laying within Jacob's reach	Jacob has not played with this toy recently. Jacob's friend is present, and they like to play with the toy together.	Jacob has had access to the toy all day. No one is around to play with.
Teaching Jenny to use a synthesized speech output device to greet customers at work using the phrase: "Hello, can I help you?"	Customer approaches Jenny and says "hi" Customer looks confused or lost	Jenny is in the break room with coworkers. A customer is interacting with another employee.	Jenny has just arrived at work and has not had much social interaction. Jenny is feeling healthy and alert.	Jenny is at the end of a long work day and has helped many customers. Jenny is feeling ill and/or tired.

Note. S+ indicates corresponding stimuli meant to elicit a response and S– indicates irrelevant stimuli not meant to elicit a response.

The role of stimulus prompts. We will discuss stimulus prompts in the context of teaching the use of graphic symbols that could be housed in a communication wallet, on a communication board, or as part of a speech-generating device (SGD). The first step is to establish some type of independent response, such as touching a single symbol card. For example, once a card representing "horsy ride" is selected, the learner receives bounces on his or her parent's knee. Once this response has been mastered, stimulus prompts can be a useful tool for teaching conditional discriminations, such that the conditions under which a learner selects the target symbol can be systematically altered across opportunities. This allows the learner to begin with successful discriminations between two or more marked distinct stimuli that are gradually altered to become more similar, ultimately resulting in a more challenging discrimination. Stimulus prompting includes both stimulus shaping (building) and stimulus fading. In stimulus shaping or building, the interventionist systematically increases the challenge provided by symbols that the learner should refrain from selecting (distracters) once he or she has mastered selecting the initial symbol targeted for intervention. In stimulus fading, a portion of the original stimulus is systematically and gradually removed without interrupting correct responding across instructional opportunities. Several investigators have described very innovative tasks to teach children with severe disabilities who struggle with simple discriminations. One of these is an oddity task. The objective in an oddity task is for the learner to demonstrate that he or she can discriminate between two or more items. Typically, to make this discrimination as straightforward as possible, the interventionist does not rely on cues or prompts preceding an opportunity to make a selection. Instead, the choice that the learner selects is reinforced. During subsequent opportunities, as the position of the choices is randomized, the learner continues to be reinforced for the original choice. Once this history is established, the interventionist establishes a different item in the array as the correct choice. If the learner "sticks" with the original choice, he or she is not reinforced. As soon as the learner selects the newly designated item, he or she is reinforced. This is referred to as reinforcement control in that reinforcement history enables a learner to demonstrate a simple discrimination (see Reichle & Wilkinson, 2012).

Shifting from simple to conditional discriminations. Once the learner can reliably engage in simple discriminations, strategies to transition from a simple to a conditional discrimination can be implemented using the matching paradigm described earlier and in Table 2. Typically, with a learner who has no history of successful conditional discriminations, this entails teaching identity matching (e.g., color photo to an identical color photo) followed by nonidentity matching (color photo to nonidentical photo or color photo to identical featured real object). One example of moving from simple to conditional discrimination of communication for learner Dakota included the following steps. Dakota was a young girl with autism who had been pressing a microswitch to access preferred foods and drinks during snack time during approximately 80% of opportunities. Subsequently, her interventionist introduced conditional discrimination instruction during which Dakota was offered opportunities to press the microswitch to access preferred foods and to abstain from pressing the microswitch for nonpreferred foods. Dakota attended to an offered food item and varied her responding based on whether it is a preferred or nonpreferred food. After she is approximately 80% successful with these opportunities, her interventionist placed the symbols on a low-tech communication board with three separate preferred foods and to chain Dakota's responses by first having her

indicate she wants "food" with the microswitch and then moving to the low-tech board to select a symbol from an array of available food items.

Promoting generalization of communication skills. Intervention strategies aimed at improving stimulus generalization for learners with significant disabilities have been explored by several investigators (Chadsey-Rusch & Halle, 1992; Johnston et al., 2012; O'Neill & Reichle, 1993; Stokes & Baer, 1977; Stokes & Osnes, 1989). Stokes and Baer (1977) reviewed and summarized nine strategies reported by researchers to use in monitoring or facilitating generalization, and Stokes and Osnes (1989) further refined the work by Stokes and Baer and described three general principles of generalization programming with several tactics under each area (see Table 3 for examples). These areas included (a) exploiting current functional contingencies with specific tactics that included contacting natural consequences, recruiting natural consequences, modifying maladaptive consequences, and reinforcing occurrences of generalization; (b) training diversely with specific tactics that included using sufficient stimulus exemplars, using sufficient response exemplars, making antecedents less discriminable, and making consequences less discriminable; and (c) incorporating functional mediators with specific tactics that included incorporating common salient physical stimuli, incorporating common salient social stimuli, incorporating self-mediated physical stimuli, and incorporating self-mediated verbal and covert stimuli. For example, a salient physical stimulus might involve clearly displayed rules in the school cafeteria or on the playground with a target behavior of walking rather than running. With respect to a salient social cue, an interventionist might select a peer that shares the same schedule as your target student who has been part of the original group in which instruction to learn a behavior was delivered. Finally, a self-mediated stimulus might involve establishing a recording mechanism for the learner to self-monitor his or her uses of a behavior such as requesting a break to ensure that it is not overused. Unfortunately, the challenge with respect to the strategies just described is that, for the most part, they focus on only variables associated with when to use a newly established response while minimizing the importance of concurrently learning the conditions associated with not using a newly taught response. Stokes and Osnes concluded that the strategies described in Table 3 showed promise based on the existing literature.

In examining studies published in three journals from 1990 to 2002 that were focused on the study of applied behavior analysis, Osnes and Lieblein (2003) reported that researchers devoted increasing attention to arranging variables during acquisition to promote generalization, instead of relying on implicit "Train and Hope" strategy. Most of the studies reviewed reported generalization and provided some overt generalization strategies in the procedures. Similarly, Hughes et al. (2013) reviewed studies on social interaction skill intervention across a range of secondary school students with ASD and/or intellectual and developmental disabilities, published from 1980 through 2011. Among the 13 studies identified, eight reported strategies designed to program generalization as described by Stokes and Baer (1977), including (a) training sufficient exemplars, (b) programming common stimuli, and (c) mediating generalization. Falcomata and Wacker (2013) were interested in identifying whether tactics described by Stokes and Osnes (1989) were applied to promoting generalization in functional communication training. They conducted a systematic literature review that focused exclusively on functional communication training that involved an analysis of generalization across contexts, stimuli, or individuals from 1985 to 2012. Among the 23 studies examined, only eight specified tactics for promoting generalization within the framework outlined by Stokes and Osnes, and for the most part, the tactics involved recruiting natural consequences, modifying maladaptive consequences, using sufficient stimulus exemplars, and programming common physical stimuli. In this sense, the authors concluded that only a small number of the studies examined had systematically evaluated generalization.

Since Stokes and Baer (1977) and Stokes and Osnes (1989), there has been progress in strategies to enhance generalization performance in learners with intellectual and other developmental disabilities. A plethora of systematic literature reviews on diverse interventions for this population (Browder & Grasso, 1999; Carter, Sisco, Chung, & Stanton-Chapman, 2010; Chowdhury & Benson, 2011; Koyama & Wang, 2011; Morse, Schuster, & Sandknop, 1996; Snell et al., 2010; Taft & Mason, 2011) emerged. Among the studies addressed in these reviews, generalization that was reported ranged from 34% to as high as 86%. However, the preponderance of this evidence focused on conditions under which to use a newly established response but not on when to refrain from using it. Despite progress to date, two questions then remain: What is a promising intervention framework to more comprehensively address conditional use that concurrently addresses generalization and discrimination, and how do we more comprehensively evaluate conditional use?

Tying It All Together: General Case Instruction as a Framework to Promote Conditional Use

As discussed throughout this tutorial, general case instruction frameworks have been mentioned as a solution for how to program for conditional use of communications within communication interventions. In this section, we apply what we have already described for the principles of generalization and discrimination into how to program interventions for conditional use of communication skills using general case instruction frameworks. The goals of general case instruction are to address conditional use from the onset of intervention, as opposed to as an afterthought, ensuring that learners generalize the targeted communication skills to novel and untrained contexts and that learners discriminate when not to use the communication skills or when to use other skills instead (Horner & Albin, 1988; Reichle & Johnston, 1999). General case instruction requires the concurrent implementation of some teaching

Table 2. Sample key strategies for moving from simple to conditional discrimination.

Skill area	Rationale for level of discrimination	Key strategy	Troubleshooting
Teaching simple discrimination	Implemented to ensure that the learner has a socially acceptable, desirable, and observable response to select a symbol (e.g., touching, eye gaze). Note: we will use touching in this example.		
1. Ensure a signaling response			
2. Identify reinforcers	2. This ensures that a learner will sustain engagement during a task.	2. Conduct pairwise comparisons of items recommended by familiar observers. Randomize presenting choices. Ensure that each item appeared with all the other items several times. Compute a ranking of the items.	2. If learner cannot make choices, present one item at a time recording the number of items taken before satiation or the duration of engagement before satiation.
3. Verify that learner can distinguish between items	3. The learner must be able to distinguish between symbols to use them functionally.	3. Place two to three symbols (symbols not representing known reinforcers) before the learner. Encourage selection of a symbol. The symbol selected is defined as the correct response or the target symbol. Across opportunities, randomize the placement of the symbols (to ensure learner is looking at the symbol and not the location. Reinforce selecting the target symbol; do not reinforce selecting the incorrect symbol. Continue until learner consistently selects the target symbol.	3. If the learner does not select a symbol, then use the least intrusive prompt to select symbol.
4. Implement reversal	4. A reversal ensures that the learner is flexible in selecting his or her response by using reinforcement to inform his or her response (rather than perseverating on the same response) and primes the learner to attend to environmental stimuli.	4. The target symbol that was previously reinforced is no longer reinforced. Arbitrarily, a different symbol that had already been appearing in the array becomes the new target symbol. Repeat Step 3 with the new target symbol.	4. Continue conducting opportunities and providing prompting as needed until the learner refrains from selecting the previously reinforced target symbol and now selects the new target symbol.
5. Continue conducting reversals	5. This ensures that the learner is becoming increasingly flexible in his or her responses and is beginning to pay attention to environmental cues.	5. Reduce the number of opportunities before implementing a reversal until the opportunities are being presented in randomized order.	

(*table continues*)

Table 2. *(Continued).*

Skill area	Rationale for level of discrimination	Key strategy	Troubleshooting
Teaching conditional discrimination	Matching-to-sample (MTS) can serve as a skill to ensure a learner attends to a sample as the instruction to inform a choice. Assuming that the learner engages in simple discriminations, interventionists should assess and target identity and nonidentity matching.		
1. MTS: identity matching	1. Ensures that a learner can begin using a sample as an instructional cue.	1. Select a sample ("red apple") and present an array that includes an identical red apple (the correct choice) and other incorrect choices (such as a red fire truck and a blue ball). Present the sample but do not place the choices in front of the learner. Once the learner views the sample, place the choice in front of the learner. When the learner selects the correct sample, provide reinforcement. Wait for several seconds to provide a least intrusive prompt if the learner does not select the correct sample (time delay). If the learner does not respond after the short period (e.g., 2 s), provide a least intrusive prompt. Across opportunities, fade prompting systematically. Implement subsequent teaching opportunities in randomized locations and order, targeting one to three different correct choices.	1. After several seconds, if a learner begins to select an incorrect choice, provide the least intrusive prompting. Several additional troubleshoots include: Conduct trial blocks with multiple opportunities back-to-back with the same target item, followed by multiple opportunities with a different target item, and slowly reduce the number of trials in between until able to present opportunities in randomized order.
2. MTS: nonidentity	2. Nonidentity MTS follows the same teaching structure as identity MTS; however, this skill promotes discriminating and generalizing the types of salient features that make up a symbol (e.g., a learner moves beyond matching a ball because it is the same size, color, and brand of the ball pictured in a sample symbol).	2. In addition to the above steps, identity MTS can become a prompt to target nonidentity MTS.	

Note. Portions of the outlined framework described in this table are described in greater detail in Reichle et al. (2012).

Table 3. Strategies to facilitate generalization recommended by Stokes and Baer (1977) and refined by Stokes and Osnes (1989).

Intervention strategy	Example for communication intervention to teach Allison, a child with autism, to produce a request for "trains"
Stokes & Baer (1977)	
Train sufficient exemplars	Use eight different toy trains (sizes, shapes, colors) during intervention (teach a minimum of four and withhold four to probe for generalization).
Train loosely	Conduct intervention on floor in playroom, with Allison's siblings present.
Teach indiscriminable contingencies	Plan intervention so that all siblings share and ask for trains; coach siblings to pass train back to Allison after she asks.
Program common stimuli	Train toys are used that are within Allison's home/day care center (interventionist not solely teaching with trains not present in Allison's home).
Mediate generalization	Interventionists plan to conduct opportunities in locations other than the toy room, including Allison's daycare, and bring along the visual choice board that was initially used at home.
Train to generalize	Interventionists choose a communication response (voice output device) that is easily understandable across environments (home and daycare) and communication partners (parents, siblings, kids at daycare).
Stokes & Osnes (1989)	
Exploiting current functional contingencies	Interventionist selects teaching a request for trains because of observing Allison frequently pulling her siblings' hair to gain access to trains previously.
Training diversely	Similar to training loosely, incorporating varied and less pronounced antecedent stimuli into training.
Incorporating functional reinforcers	Utilizing functional reinforcer, of access to trains, a tangible item (as opposed to another consequence, such as praise) to strengthen the request.

examples (herein referred to as exemplars) that have characteristics associated with a specified response (positive exemplars) and other exemplars that do not have characteristics that are sufficient to signal emission of the specified response (negative exemplars). As such, members of the same stimulus class all share at least one common characteristic that distinguishes the stimulus class from other classes. Correspondingly, when stimuli are not members of the target stimulus class (i.e., S–), the learner should learn to not produce the target response. When learners can distinguish when both stimuli do and do not match stimulus class characteristic(s), a general case instruction format has been successful in establishing a conditional discrimination (Chadsey-Rusch & Halle, 1992; Chadsey-Rusch, Drasgow, Reinoehl, Halle, & Collet-Klingenberg, 1993; Horner, Sprague, & Wilcox, 1982; O'Neill & Reichle, 1993). With a well-designed general case instructional format, appropriate generalization of newly acquired skills will be maximized, whereas at the same time, overgeneralization and undergeneralization will be minimized. Overall, general case instruction provides a useful tool for practitioners as well as for researchers in promoting the conditional use of communicative skills. Next, we detail how to execute the six-step procedure outlining general case instruction delineated by O'Neill and Reichle (1993).

Step 1: Defining the Instructional Universe

In general case instruction, careful attention is given to all items and events (stimuli) for which an individual would be expected to emit a particular response. It is therefore important to maximize the identification of these relevant events (i.e., the instructional universe) to provide sufficient examples and nonexamples for teaching and assessment. For example, if teaching a learner to request assistance with challenging tasks, the interventionist might begin by creating an extensive list of tasks in which the learner participates on a regular basis. Once the tasks have been identified, the next step would be to determine which of those the learner can complete independently compared with those for which assistance is typically required. If the interventionist was unsure about whether the learner could complete certain tasks independently, he or she may implement an assessment to determine the learner's level of independence with each. From these tasks, the interventionist would select a set of positive exemplars for the subsequent teaching and assessment opportunities.

Ideally, exemplars representing the entire instructional universe would be used as exemplars during skill acquisition. However, this is rarely a practical undertaking. Some exemplars identified may occur infrequently, whereas others may require significant resources to implement (i.e., at a child's grandparents' house that is 200 miles away). In identifying exemplars, it is important to select a range of stimulus characteristics that adequately sample important characteristics that will help the learner discriminate between when and when not to use the response being taught (doing so will maximize the probability of desired generalization).

For example, suppose that during social studies the learner throws paper to obtain escape (get kicked out of class) not because the work is too difficult but because the work takes too long (at least from the learner's perspective). In other situations, it might be that the difficulty of the work results in avoidance- or escape-related response. In the former instance, teaching a break request may be the best option, whereas in the latter case, teaching an assistance request may be the same option. In the scenarios just described, two different members of the same response class that address an escape-related problem behavior could be taught.

There may be some cases in which the reinforcer who maintains the same behavioral form may be different

but the alternative response option may be the same. Consider, as an example, a learner with a history of tantrums when she cannot successfully obtain a desired object or activity. She also tantrums when she cannot successfully complete household chores. In each case, the alternative communicative response to be taught is an assistance request, although the maintaining consequences for the two contexts differ (i.e., access to a desired object and escape from task demands, respectively). These are aspects of generalized use, which are best addressed during acquisition by including sufficient teaching examples.

Step 2: Define the Learner's Known and Targeted Communication Skills

Compiling a list of the learner's current communication skills and identifying the communication skills that will be taught and appropriately fit into the instructional universe of teaching exemplars may be done. For example, before intervention, Ella, a young girl with Rett syndrome, extends her arms to obtain her parents' attention. As a result, her interventionist is planning to teach Ella to select a symbol on a dedicated SGD to request attention. The interventionist would note both the reaching and use of the SGD to plan for including some teaching exemplars where it may be more appropriate for Ella to use the reaching request (e.g., in the pool where the device cannot be set up) in the intervention.

Step 3: Select the Teaching Exemplars

As already discussed, general case instruction requires a range of positive and negative exemplars that adequately reflect the range of relevant stimulus variation, as opposed to the one or, at best, few teaching exemplars traditionally used in interventions with individuals with CCNs. For example, if one is teaching the learner to use the symbol for apple, one might want referents for the learner to use that symbol with, which include red, green, and yellow apples. In addition, small and large apples should be used. Although these have different physical features, they sample a reasonable range of characteristics associated with apples. As such, the preceding constitutes positive teaching examples (stimuli that should be labeled apple). In addition, we know that pears can be yellow green and of an orangey color. As such, one might include them as intervention stimuli as they have characteristics in common with apples, but because of the shape of a pear, it is distinguishable from an apple. As such, these latter examples constitute negative teaching examples (stimuli that should not be labeled apple).

Steps 4 and 5: Sequence and Teach the Exemplars

Teaching positive and negative exemplars concurrently, rather than sequentially, has been demonstrated as an efficient strategy to promote appropriate discrimination (Ingvarsson & Hollobaugh, 2010; Panyan & Hall, 1978; Reichle, Lindamood, & Sigafoos, 1986). That is, one could teach the learner to associate the symbol representing "apple" with the varying examples of apple described in Step 3. However, concurrent teaching would suggest having pears available during some opportunities where the learner should refrain from using the symbol representing apples. Likewise, using a combination of sequential and concurrent sequencing, where a specific target is introduced in isolation for a limited number of instructional opportunities and then presented concurrently with other new or previously taught targets, has also been demonstrated as effective (Cuvo et al., 1980). For example, learners with severe developmental disabilities may have difficulty continuing to perseverate on a response. This can create challenges when stimuli shift frequently across opportunities. Thus, sometimes, interventionists "block trials." In this instance, three consecutive opportunities might occur in which apples are presented as the sample in an MTS task. These would be followed with three consecutive opportunities during which "pears" would serve as the sample in the same matching task. By doing this, the interventionist essentially is implementing an "oddity" paradigm of sorts where the shift from one sample to another may become more salient as a function of the pattern in teaching opportunity presentation.

Once two different intervention targets (e.g., "apple symbol" and "pear symbol") are being introduced during the same session/activity, blocked intervention opportunities in which one intervention target receives instruction during a set number of opportunities followed by the same number of teaching opportunities when a different target is implemented can be very helpful with some learners. Gradually reduce the number of opportunities in each block until instruction across the two targets can be presented randomly (Pérez-González & Williams, 2002). Blocking can be helpful with learners who have a particularly difficult time learning conditional discriminations.

Step 6: Assess Outcomes From General Case Instruction

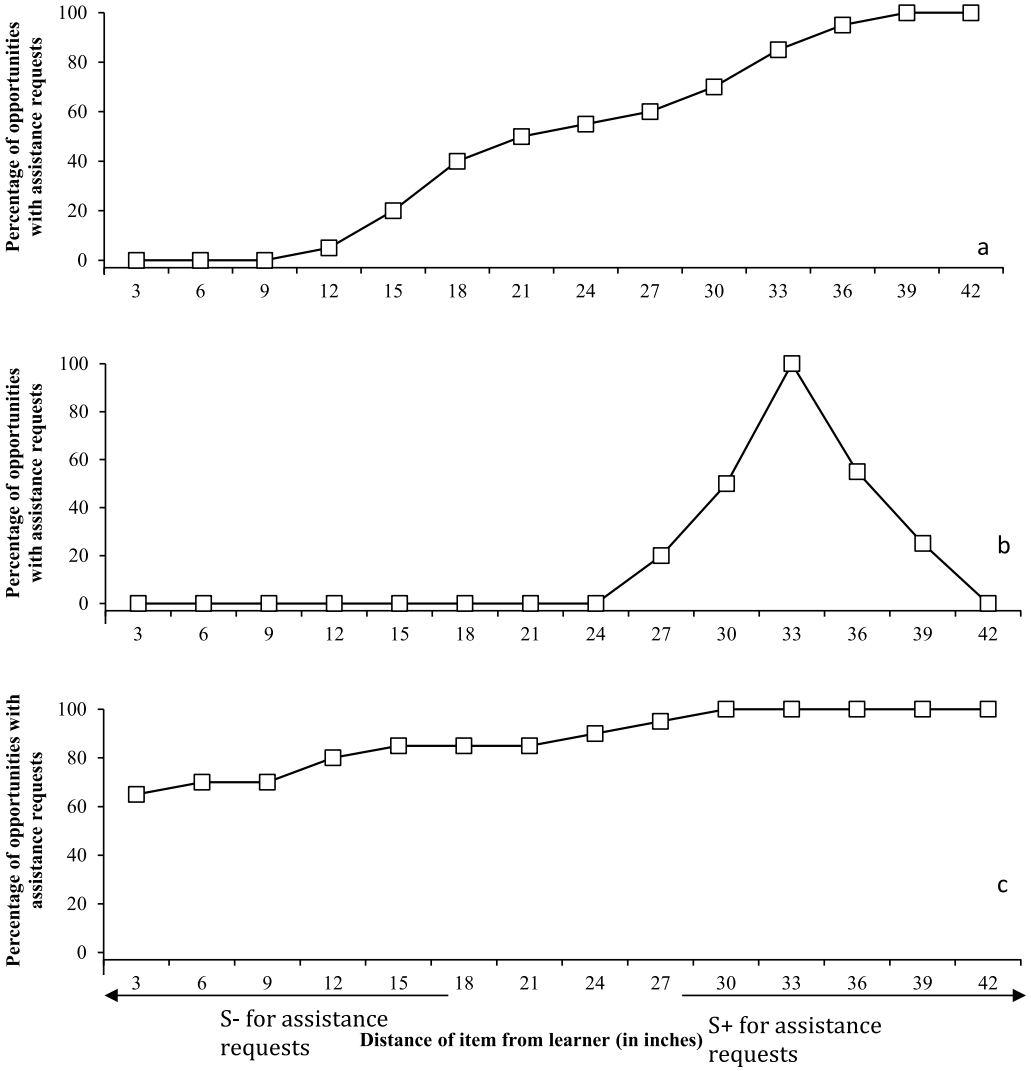
As previously noted, studies examining generalization of newly acquired communicative responses often only consider performance across a relatively limited set of untrained environments, people, or items/events. Rarely do generalization probes include an examination of the learner's ability to refrain from engaging in a given communicative response where it would be inappropriate to do so. For example, consider an individual who learned to ask for help to obtain preferred snacks that are out of reach. During intervention, a stimulus for requesting assistance (S+) might entail placing the item out of reach. During these opportunities, requesting assistance emissions would be taught. However, during a second stimulus condition in which the preferred snack was placed 5 in. from the learner and within easy reach (S−), emissions of requesting assistance would not be reinforced. Having taught the learner to emit the assistance request to the S+, but not in the presence of the S−, will have resulted in teaching conditional use, but it does not ensure that the learner can discriminate and generalize how to respond outside the range of the two extremes that we have identified. The first task in this scenario would be to determine

under what circumstances (stimulus characteristics) the use of the assistance request begins to wane and when it continues to be produced. A generalization gradient can be applied to answer this question (Hanson, 1959).

A generalization gradient permits an assessment of stimulus generalization across a continuum of changes in the potential discriminative stimulus. This is useful in profiling the relationship between stimulus discrimination and generalization and may help us better understand conditional use of communication. It also allows the interventionist to view the nature of errors that may occur during generalization opportunities. To revisit the earlier example, a learner is taught to request access to preferred items conditional on the distance of the items from the learner. Ideally, the learner should be able to discriminate between the closer distances, at which he or she should reach for the items and refrain from requesting assistance, and the farther distances, at which the learner should request assistance. Hypothetical representations of appropriate and problematic patterns of generalization and discrimination after initial acquisition training for this response are displayed in Figures 1a–1c.

In the first case (Figure 1a), the learner shows an appropriate pattern of conditional use in that he or she consistently requests assistance at the larger distances, occasionally at the middle distances, and rarely at the smallest distances. This pattern might evolve spontaneously because of reinforcement contingencies in the natural environment or might result from systematic instruction across the range of distances, including far (S+) and near (S−)

Figure 1. (a–c) Depiction of hypothetical generalization gradients for requesting assistance to have access to preferred snacks across different object distances. The top panel (a) represents an appropriate pattern of discrimination/generalization. The center panel (b) represents a pattern of undergeneralization. The bottom panel (c) represents a pattern of overgeneralization.



opportunities. In contrast, Figures 1a and 1b represent undergeneralization and overgeneralization, respectively. The former pattern could be described as a pattern of restricted stimulus control or stimulus overselectivity, as the desired pattern of generalization to farther distances did not occur. In this example, the most likely source of this error is training with single (or a restricted set of) exemplars, in this case specifically, training at 33 in., but not other distances at which it would be appropriate to request assistance (with or without training for S− exemplars). The latter pattern could be described as irrelevant stimuli controlling the target response, as the stimulus controlling the response appears to be the presence of preferred snacks, rather than changes in the distance of the items, which are the stimuli that the interventionist views as relevant. Alternatively (or additionally), the lack of discrimination could be attributed to limited variations of the target response, as it is possible that the learner does not have an alternative response, such as independently reaching for the preferred snack, in his or her behavioral repertoire. In either case, this error pattern is most likely to result from training under only positive exemplar (S+) conditions, in the absence of negative S− exemplars.

As depicted in Figure 1, displaying a generalization gradient has implications for examining conditional communication use. In a generalization gradient, it is clear when a learner discriminates both when to use and when not to use a given communicative act with respect to novel exemplars. Therefore, the use of generalization gradients has the potential to identify instances of both overgeneralization and undergeneralization that could undermine optimal generalized use of newly acquired vocabulary items. Equally important is that this information can assist the interventionist in the selection of additional teaching examples. Furthermore, if many learners have difficulty in the same areas of the gradient, this information may guide a readjustment of positive and negative teaching examples during future implementations of the intervention.

Among competent communicators, code switching (using one language style with an adult but a very different language style with a 12-year-old peer) and communicative repair (knowing when to request a clarification and when no clarification is needed) represent two important examples of conditional language use, although there are many others. Communicative repair represents an area of challenge for many learners with CCNs including ASD. A general case framework could be helpful in identifying situations where specific types of repair requests would be helpful. Some examples of repair queries that would be helpful for learners to be able to use in a well-discriminated and generalized manner include (a) requesting that an utterance be repeated, (b) requesting that an utterance be rephrased using simpler language, (c) requesting that a crucial word in a message be explained, and (d) requesting that a learner replace a deictic word with a more explicit reference (e.g., using a proper name rather than a pronoun). Correspondingly, teaching learners to provide informative information and refraining from communicating unnecessary information during an exchange represents an ideal application for general case instruction.

Conclusion

People are always faced with the need to discriminate when, how, and why to use communicative response, as the conditions under which we use communication responses constantly vary. Although communication production is empowering, it needs to extend beyond initial acquisition. Learners with CCNs, as all of us, are faced with the need to conditionally use communication by making decisions such as whom to communicate with, when to do so, and what to say. People are also faced with when to communicate different kinds of things, as telling a loud joke would garner different reactions in a noisy restaurant versus a library. People are also faced with what to communicate for in different kinds of situations, as treats like popcorn may be available as an evening snack but not available while brushing one's teeth. These are only several examples of challenging pragmatic discriminations for persons with significant developmental disabilities that require careful planning using an instructional approach such as general case instruction.

For many learners, there will be ample opportunities to visit with an array of familiar persons during any given day (e.g., peers, young siblings, teachers, store clerks, and grandparents). The topics that appeal to each of these groups are apt to be different, and specific words and symbols used with each to communicate the same information may be very different (e.g., some topics would be very appealing to a very young child but not particularly interesting to peers or grandparents). This "differential teaching need" can be a formidable challenge that, at least during initial instruction, may be made easier by considering a general case instruction framework. General case instruction combined with systematic instructional methods holds great promise for teaching learners with CCNs some of the nuances of social language use, which can have a substantial impact on social interactional skills.

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