Incidental Teaching: Happy Progress

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The purpose of any teaching program is learner progress. We teach so that our students diagnosed with autism spectrum disorder (ASD) can learn under the most normalized conditions possible and continue to develop in successful ways across settings and time. Incidental teaching is a contextualized instruction that takes advantage of naturally occurring opportunities – "incidents" – to teach valued skills in the context of child preference and use (Hart & Risley, 1968; Haring, 1992).

The aim of this chapter is to present the potential benefits of incidental teaching for increasing social competence for children with autism. Competencies are comprised of groups of *behaviors* under the conditions of use that lead to particular *outcomes*. In this context, social *behavior* covers a wide expanse and can include diverse skills such as orienting, imitating, communicating, sharing, and negotiating. The social *outcomes* resulting from our teaching success also cover a wide expanse, ranging from play partnerships to situational friendships to enduring and loving companionships. Specific competency goals will vary for each child and the values and norms of their social community. Our examples and recommendations focus on social *behaviors*, with the understanding that the practitioner will place these goals in the context of meaningful competencies. The essence of incidental teaching for social skills is to make the most of motivating variables and present conditions to help the learner learn component social skills, maintain social engagement, and develop mutually beneficial relationships.

This chapter is organized within the context of evidence-based practice (Slocum et al., 2014). That is, successful clinical work is based on sound understanding of the basic mechanisms and principles, best available research evidence, and clinical experience and wisdom (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). For that reason, we first provide a description of the theoretical framework supporting incidental teaching, illustrate incidental teaching procedures, summarize the empirical evidence base, and end the chapter with key recommendations based on theory, research, and our clinical experience.

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11.1 Theoretical Framework and Basic Procedures

We cover the theory behind the procedures because it is one of the three driving forces for successful evidence-based practice. If a practitioner

J.B. Leaf (ed.), *Handbook of Social Skills and Autism Spectrum Disorder*, Autism and Child Psychopathology Series, DOI 10.1007/978-3-319-62995-7_11

understands the theory and basic mechanisms, they may be better able to implement the procedures with fidelity and generalize and extend the procedures to new situations and teaching problems (Johnston, 2014; BACB 5th Edition Task List, 2017). While there is a fair amount of research specifically addressing incidental teaching, there are many areas not studied. Yet, a child's world is full of potential incidental teaching opportunities, those we notice and those we create. This means that incidental teaching has the potential to be a pervasive teaching strategy across the child's day. To make the best of these opportunities, it is helpful to understand the basic principles that are believed to be responsible for successful behavior change. This is analogous to master chefs who understand the chemistry principles behind recipes. This knowledge allows them to successfully adopt, adapt, and create far beyond a box recipe.

Incidental teaching procedures were derived from common preschool practices that emphasize teaching within and through children's high-preference play activities. The procedures were formalized, behaviorally conceptualized, and applied to the language development of children living in poverty during the late 1960s and 1970s at the University of Kansas' Center for Research in Early Childhood Education (see Hart & Risley, 1968, 1974, 1975, 1980, 1982). The approach was then extended to other populations and domains (e.g., McGee, Jacobs, & Regnier, 1993; McGee, Krantz, Mason, & McClannahan, 1983; O'Brien, Porterfield, Herbert-Jackson, & Risley, 1979; Warren, McQuarter, & Rogers-Warren, 1984). Furthermore, the empirical research base supporting incidental teaching is noted as a powerful influence on the later development of several effective naturalistic teaching models (e.g., Kaiser, Hancock, & Nietfeld, 2000; Koegel, O'Dell, & Koegel, 1987; Laski, Charlop & Schreibman, 1988; Rogers-Warren & Warren, 1980; Sundberg & Partington, 1998) and is considered an "established practice" within evidence-based practice (see, for example, National Autism Center, 2015).

Incidental teaching is conceptualized within operant learning theory. Operant learning, one type of learning studied in behavior analysis, conceptualizes behavior by considering time and how behaviors change in relation to sequences of events in time. The theory is that behavior is viewed as amenable to change by arranging the type and timing of physical and social environmental events. These events will shift probabilities related to increases or decreases in behavior. Temporal events are broken down into units, and the process is described as a *contingency*, a dependent relation between different events in time. The theory is supported by thousands of experiments verifying the operant processes of learning involved in stimulus control (the events that come before behavior) and consequence control (the reinforcing or punishing events that come after behaviors). For examples of this research base one can refer to textbooks such as *Learning* by Charles Catania (2013).

Incidental teaching involves physical or social events in the child's natural environment with natural interaction partners and events specific to the child's interests. The dependent relations, or contingencies, are arranged around child interests and taught under the conditions of use. In the context of social behavior, incidental teaching is a way of arranging contingencies to produce improved changes in behavior between interaction partners. The basic assumption, from a behavioral standpoint, is that all social interactions are contextually dependent and interaction partners will mediate one another's behavior through a process of contingent interactions (Skinner, 1957; Haring, 1992). Haring (1992) describes this process:

> The skill has to be understood in relation to the goals that a child has for his or her social behavior, the quality of support that the social behavior receives from others, and the power of the simple presence and responsiveness of others in the child's natural settings to increase the occurrence of the behavior. In other words, a more contextualistic analysis considers the goals and functions of the behavior from the child's perspective, as well as the social responses that the child receives in interactions with others, which reinforces social behavior. (p. 309)

When considering social behavior, the contingency involves the discriminative actions and consequences of the social partners. It also involves the motivation for the child to respond under the social contingencies. A typical method of illustrating an operant contingency is presented in Fig. 11.1.

A contingency is a dependent relation in time. Each event has an effect on subsequent events. The stimulus conditions, represented in the schematic as $\mathbf{S^{D\Delta}}$, are those antecedent events that set the occasion for a response to occur (discriminative stimuli or S^D) or not occur (delta stimuli or S^Δ). This part of the process is called *stimulus control*. **R** stands for the response topography of the behavior. This is what the child does, or is to do, in response to the stimulus conditions. The response will be strengthened or weakened by what follows, the consequent stimuli (for our purposes, $\mathbf{S^{R+}}$ or $\mathbf{S^{R-}}$). The stimuli that follow the response will affect the increase or decrease of the response. This is called *reinforcer control*. Motivating operations (**MO**) are those events that alter the reinforcing value of the consequent stimuli; they increase or decrease the value of a consequence. Environmental arrangements are methods to arrange motivation and insure that preferred events and materials are accessible but regulated by the interaction partner. The MO is an essential part of the incidental teaching contingency.

Consideration of all four parts of the contingency and their relationship to one another is considered critical to the success of incidental teaching procedures. Contingencies are arranged around the child's interests, and the stimulus and reinforcement conditions are at the full or approximate criterion conditions in the natural environment. Three factors are especially important in the incidental teaching contingency: (1) child preference; (2) teacher responsiveness to child progress, initiations, and affect; and (3) response specific reinforcers.

First, the child has to indicate in some way that there is a preference for an activity or event. This creates the teaching "incident" and is commonly called a "child-initiated" learning opportunity. The child initiation indicates a preference (hopefully a reinforcing event), and especially in the case of social development, it is preferable that it is a positive reinforcement contingency (i.e., producing approach behaviors), rather than contingencies involving negative reinforcement (i.e., producing escape behaviors) or punishment contingencies (i.e., producing avoidance behaviors). In this regard, a child that is approaching the social partner and displaying indices of favorable affect (e.g., happiness) is more likely to be ready and responsive to an incidental teaching interaction and under the control of positive reinforcement contingencies. For example, a young child reaches for a blue car in a closed container that only his big brother can open. Smiles and eyebrow raises accompany the young child's reach and not grimaces or tears. The big brother can use this initiation as a signal to start an incidental teaching interaction. From a theoretical and methodological point of view, this increases the chance that there will be a reinforcing consequence for the behavior being taught and that the brother has been arranging the right balance of response requirements so his sibling is still happily initiating and approaching the social situation. There is precedent for considering affect as a component part of naturalistic teaching procedures (Koegel, Bimbela, & Schreibman, 1996).

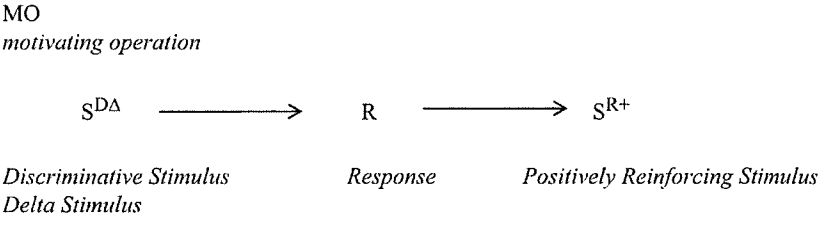

Fig. 11.1 Schematic of a contingency

The second point is that incidental teaching requires a responsive teacher that observes and adjusts to the learner's progress. That is, the teaching should be progressive with the learner engaging in increasingly more complex social responses under increasingly more complex conditions. For example, at first the brother may require just a simple vocalization, "blue car." But in order to be progressive, the activity and the target should become more complex and socially robust. For example, the siblings might set up a race track and additional interactions can be added, such as requesting to "crash the cars" or adding instructions to be followed, such as, "Give me the truck so I can crash into your car," or actions to imitate, such as adding pieces of the track during the play activity before getting access to the zipline to activate the car through the track. Of course, while the response requirements are made increasingly complex and diverse, the teacher maintains a balance between the response requirements and access to reinforcement. This is more likely to ensure positively reinforcing contingencies and is accomplished by relying on indicators such as child approach and initiations that are accompanied by indices of happiness and enjoyment (Green & Reid, 1996).

Third, the child's response and the consequence must be related and consistent. For example, the child asks for a blue car and gets a blue car, not a green bus, a potato chip, or a token. From a theoretical point of view, specific response-reinforcer relationships may contribute to the strengthening of a given contingency (Davison & Nevin, 1999; Koegel & Williams, 1980; Schreibman et al., 2015), and from a methodological point of view, it is more likely to be a useful and functional contingency in the child's daily life (Dyer & Peck, 1987). That is, the responses taught are ones more likely to be used in the natural environment, and the contingency will be maintained. For this reason, assessment in the natural environment plays a critical role in the incidental teaching process.

Like all educational programs, we begin with envisioning and assessing. Participation by the stakeholders in the child's life is an essential component to incidental teaching. It is especially important because the arrangement of the teaching should be tailored to the goals and the conditions of the child's natural environment. The stakeholders are the key players in this social environment, and understanding their behaviors and preferences is a critical component of the assessment process. The assessment process continues as reasonable, meaningful, and potentially generative stakeholder goals are understood. Assessment also involves analysis of current child skills and environments, in particular, the incorporation of variables of the current and subsequent least restrictive environments (Brown et al., 1979) and cues related to the criterion discriminations in the natural environment (Etzel & LeBlanc, 1979). All of this is accomplished through a series of ecological assessments, stakeholder interviews, and curriculum guides (see, e.g., Division for Early Childhood, 2014; McLean, Bailey, & Wolery, 2004; Noonan & McCormick, 2014; Odom, McConnell & McEvoy, 1992; Taubman, Leaf & McEachin, 2011; see Chaps. 6, 7, and 8).

As specific goals are agreed upon, the design of the teaching programs begins. A key feature of incidental teaching is the teacher's use of naturally occurring incidents to set the occasion for teaching desired social behavior. There are approaches to naturally occurring opportunities: 1) noticing present child preferences in an existing environment or 2) intentionally introducing regulated access to high-preference events. In most cases, children with ASD will require both approaches due to the restricted activities and interests that are part of the defining features of ASD. To some degree, a technology for arranging enticing and favorable incidental teaching environments has been developed. For example, McGee, Morrier, and Daly (2001) provide extensive descriptions for creating an incidental teaching environment in inclusive early childhood education settings. McGee and colleagues suggest arranging the overall physical structure, rotating provision of high- and neutral-preference toys and activities, and providing methods for creating specific incidental teaching opportunities. In every case, the environment is arranged so

that children must respond in order to access desired social and physical events. Textbooks such as *An Activity-Based Approach to Early Intervention* by Johnson, Rahn, and Bricker (2015) and *Teaching Young Children with Disabilities in Natural Environments* by Noonan and McCormick (2014) also provide examples of specific strategies to create incidental teaching opportunities. For example, Noonan and McCormick summarize six specific ways to arrange the environment, or motivating operations (MOs), that include having interesting materials and activities, having items visible but out of reach, offering inadequate or missing portions, providing choice situations, setting up situations where assistance is needed to complete the activity, and creating unexpected or "silly" circumstances. In every case where interest is evoked, the child may initiate and that is the opportunity, the incident, that allows teaching to occur.

To illustrate the theoretical concepts and basic incidental teaching procedures, we provide two simple examples. The first is an example of social orientation with a very young child and the second an example of social bidding with an older child.

11.1.1 Social Orienting Example

Social orientation between communication partners is considered an important behavior for a variety of reasons. Orienting to your social partner can indicate interest and attention, comfort, or discomfort, can allow a person to reference to another to get information about the world, and can be a means to learn basic skills related to developing other skills, such as those related to communication and emotional competencies. These are just a few of the reasons social orienting may be considered a teaching goal.

In our example, Jamal is a 2-year-old boy with autism. Jamal does not make eye contact, looks away when others look at him, and does not call people by their names. Jamal spends most of his time running in circles around the house, opening and closing doors, and stacking books. There are two activities he seems to enjoy – rough housing and tickle games. His parents are being coached in the use of incidental teaching to expand his social skills. In this case, his enjoyment of tickling is the social consequence, and his family members are the interaction partners that set the occasion for and provide the desired social consequences. The parents begin with an interaction that has been going on for several weeks. Jamal pulls their hands, and then they tickle him until he is tired and moves away to one of his solitary activities. His parent described the current interaction with some discomfort: "it feels as if he is just interested in our hands." The goal of adding incidental teaching is to increase Jamal's orienting behavior and to foster more social relationships between Jamal and his parents. Figure 11.2 provides a schematic of the incidental teaching sequence Jamal's parents will use to increase nonvocal, social behavior. Each step is described below (see Fig. 11.2).

11.1.1.1 MO

To begin the incidental teaching, the motivating operations (**MOs**) are arranged. First, instead of waiting until *Jamal* stops the activity, the parent pauses the activity momentarily until he reaches, and then they start tickling again. This allows a brief period of deprivation (instead of waiting until he satiates, that is, gets tired and uninterested and leaves) and multiple chances to practice the

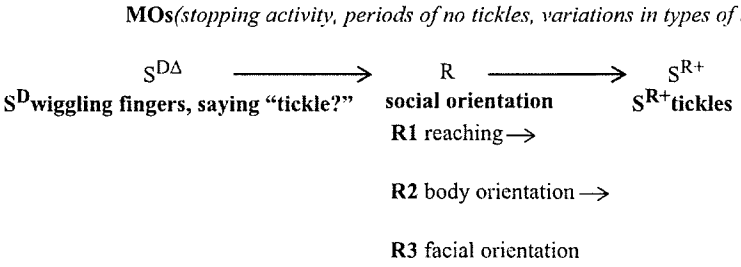

Fig. 11.2 Schematic of a contingency analysis applied to an example of Jamal's social orienting

response. Perhaps more importantly, it also teaches the back and forth nature and reciprocity of a social relationship.

11.1.1.2 S^D

Second, the parent makes a clear facial expression (e.g., eyebrows raised, smiling anticipation) and movement (e.g., fingers wiggling in the air by their faces) to signal (the S^D) they are ready to have fun and tickle just as soon as he makes an approximation to the target response.

11.1.1.3 R

Third, parents require increasingly more complex responses. At first, the parent requires Jamal to reach (**R1**), and as Jamal does this successfully, they then require him to also turn his body toward them (**R2**) and finally to look at them (**R3**). This changing response requirement is a shaping process that is progressed through the consequences (final part of the contingency).

11.1.1.4 S^{R+}

The final part of the contingency involves the consequence stimuli. The fun tickles are the positively reinforcing consequence (S^{R+}) that immediately follows Jamal's social orientations. As his social responding consistently increases, the response requirements increase and become progressively more complex.

Finally, the parents began to introduce additional opportunities and embed other social responses into the interaction. For example, his mom began making raspberries on his belly instead of tickles. To initiate this, she made the raspberry sound when Jamal looked at her, which made Jamal laugh a lot and continue looking at his mom in anticipation. His mom recognizes the laughter, looking as a happy initiation, and waits until he looks before she makes another sound. In his parent's words, "now it feels a lot more like we are connecting and communicating."

11.1.2 Social Bid Example

Figure 11.3 provides an example of an incidental teaching interaction for social bids. Devon is 11; attends a science, math, and technology charter school; and is strong in math but requires special supports in his other subjects. He is described as socially isolated and spends most of his time alone playing video games or collecting statistics on basketball and baseball players. His favorite

Fig. 11.3 Schematic of a contingency analysis applied to an example of Devon's social bids

MOs *("forgetting" the phone, arranging for cousins to play NBA2K®)*

$S^{D\Delta}$ ⟶ R ⟶ S^{R+}

Antecedent cues, S^D	**social bids**	**desired consequences**
games ends for players		
Cousin asks "who's next?"	**R1** "Can I play?"	S^{R+}cousin gives controller
Ball is in cousin's hands by basket	**R2** "Shoot it!"	S^{R+}cousin makes shot
(dad prompts, "Tell him to shoot it!")		(hopefully)
fades prompt using words, then gesture of shoot motion		
Ball is in cousin's hand	**R3** "Pass, I'm open"	S^{R+}cousin passes ball
(dad prompts, "Tell him to pass it!")		
fades prompt using words, then gesture of pass motion		

game is NBA2K®. He plays the game either by himself or with his dad. His father has worked with him on social tolerance for the last few weeks. At first his dad just sat with him while he played, and now he plays with Devon for short periods. They play "coop," meaning they each have a controller and the screen is split so both can play. His dad has been intentionally playing coop for longer durations to increase Devon's tolerance for having someone play at the same time. His intervention team has decided that his interest in NBA2K® will be a good way to work on social activities with others and that incidental teaching would be an appropriate method. They decide to work on social bids. Social bids are a way to get the attention of others, indicate interest, and make requests. Every weekend Devon's family gets together with his maternal grandmother, aunts, uncles, and cousins. Normally he only engages with his dad's phone amidst the family cooking, eating, and socializing. On the other hand, several of the cousins congregate in the family room to play video games. Dad has recruited their help to get Devon more involved.

11.1.2.1 MO

To arrange favorable conditions for incidental teaching, the motivating operations (**MOs**) are addressed. First, Dad forgets his phone in the car. This creates an opportunity to play NBA2K® in other ways. Second, he asks the cousins to play it for a while, which they are happy to do. He also asks them to play coop style. Dad makes himself available to go into the family room with Devon.

11.1.2.2 S^D

Second, his dad chooses a couple of social bids to work on and decides on the signals and prompts for each response (the **S^Ds**). He will encourage one of the cousins to ask, "Who wants the controller?" Dad will also prompt bids to shoot and pass. The prompting will begin with verbal and then gestural cues. The prompting will be faded quickly as Devon is successful.

11.1.2.3 R

Third, as the opportunity arises, Dad and the cousins will require responses specific to Devon's initiations and interests. They provide the controller when he comes into the room and asks to play (**R1**), they shoot the ball when he says shoot (**R2**), and they pass it to him when he asks for a pass (**R3**). This example uses Dad's prompting rather than shaping. In this case, access to the reinforcing consequence is more time dependent (i.e., the opportunity to pass lasts about 2 s), and the responses are all ones that Devon has made with his dad at home. For these reasons, prompting seems to be more efficient.

11.1.2.4 S^{R+}

The final part of the contingency, the consequence stimuli, involves the events that happen after Devon's social bids (S^{R+}). Getting the controller, making points, and getting access to the ball should all increase the probability that Devon will make these responses more frequently with his cousins during family weekend time.

Finally, the family started to introduce additional opportunities and embed other social responses into interactions. For example, his cousins started asking him to bring his other versions of NBA2K®, and they asked him questions about the various stats of players. They looked for online baseball games and set up opportunities for social interactions around that interest. He started to have roles for engagement during family weekends, as opposed to isolation and forbearance until it was over.

Each of these examples illustrates the basic conceptualization of the incidental teaching interaction within the three-term contingency of operant learning theory. In our next section, we review key literature on incidental teaching applications.

11.2 Empirical Evidence

In the first clinical description of individuals with ASD, Leo Kanner noted that social isolation was the most salient characteristic of this group (Kanner, 1943). The current clinical description of ASD categorizes this social dysfunction as social-communicative deficits that are manifested across three specific areas: (a) deficits in social-

emotional reciprocity, (b) deficits in nonverbal communication, and (c) deficits in maintaining/understanding relationships (American Psychiatric Association, 2013). In the following, we review the empirical base on incidental teaching of social behavior and describe the relevance of each application to the domain of social-communicative deficits in ASD.

11.2.1 Origins of Incidental Teaching

In a series of seminal studies on enriching language, Hart and Risley (1968, 1974, 1975) established an instructional framework for increasing spontaneous, elaborate speech for disadvantaged preschoolers. Hart and Risley (1968) demonstrated that traditional instruction increased children's "knowledge," or correct labeling, of colors when queried, but the children still lacked the "skill" as they were seldom observed to use color names outside of the instructional setting. To promote spontaneity, it was necessary to create learning opportunities or incidents under the control of natural, environmental cues; to promote complexity, it was necessary for teachers to prompt elaborated language and contingently deliver relevant, preferred stimuli. Accordingly, Hart and Risley (1975) outlined the basic process of incidental teaching: (1) the teacher places numerous, preferred materials in an area that is out of reach yet visible to the child, (2) the child initiates or requests an item, (3) the teacher may prompt the child to provide a more elaborated request dependent upon the quality of the initiation, and (4) the teacher provides access to the preferred item. After implementation of incidental teaching procedures, preschoolers' spontaneous use of complex language is generalized to free-play periods with peers and maintained after the discontinuation of the teaching methods.

11.2.2 Applications to Autism Spectrum Disorder

Given the advantages of enhanced generalization, incidental teaching procedures were incorporated into instructional programming for individuals with ASD to address the limited generalization yielded from analog teaching procedures, such as discrete trial teaching (McGee, Morrier, & Daly, 1999). Discrete trial teaching produced rapid skill acquisition for individuals with ASD by arranging adult-initiated learning opportunities that were under highly controlled stimulus conditions and included contingent access to highly preferred, yet often artificial, and unrelated items (e.g., receiving food for pointing to "circle"). As a result, learners quickly expanded their skill repertoire, but the skills failed to maintain over time and generalize to natural stimulus conditions (Lovaas, Koegel, Simmons, & Long, 1973). In contrast, skills taught using incidental teaching, such as reading (McGee, Krantz, & McClannahan, 1986), receptive identification (McGee et al., 1983), and preposition use (McGee, Krantz, & McClannahan, 1985), are readily generalized for individuals with ASD.

Although research on incidental teaching has demonstrated wide success with preschool populations, incidental teaching procedures can also be successfully applied to the adult population. For example, Farmer-Dougan (1994) showed increases in appropriate requesting with a peer-delivered incidental teaching procedure for adults with developmental disabilities who served as either a peer tutor or peer learner during a lunch-making routine. The experimenters used a combination of instructing, prompting, and modeling to train peer tutors to observe peers' initiations (e.g., reaches) toward an item, subsequently place the desired object out of reach, prompt the learner to verbally request the item, and deliver the object contingent upon requests. As a result of training, appropriate requests increased and generalized to peers and staff during untrained activities. Furthermore, these requests were maintained even after termination of the training. Farmer-Dougan suggests that this is likely attributed to initiations contacting naturally occurring reinforcement contingencies, that is, access to the item and social interactions from peers.

Incidental teaching procedures were originally designed to increase the complexity of language, specifically requests, by delivering learner-specified items contingent upon target language. By

design, incidental teaching procedures are well suited to teach requests or responses that are maintained by primary or tangible sources of reinforcement. To improve responding maintained by generalized social reinforcers via incidental teaching, instructors would likely need to systematically fade control from primary reinforcers to social reinforcers or incorporate techniques to actively program for generalization to social reinforcers (Stokes & Baer, 1977).

One notable example is the work of McGee and Daly (2007) who taught three children with autism to use age-appropriate social responses (e.g., "all right") during play using incidental teaching procedures and stimulus-fading techniques. In early stages of instruction, the instructors withheld access to a preferred item, and when the child initiated for a preferred item, the adult provided a social comment (e.g., "You can play with the toy next time"), prompted the child to engage in a targeted social response, and provided contingent access to the preferred item. After facilitating participants' independent social responding using prompt-fading procedures, the teachers provided a social comment during a time when the child already had access to a preferred item in the last fading step. If the child responded with a social phrase, the experimenters provided praise and continued access to the item. Following this teaching sequence, the experimenters evaluated the generalized use of social phrases, across teachers and settings. All three participants demonstrated generalization to a different free-play activity, and two of the three participants demonstrated generalization with a novel teacher. These findings suggest that control of social responses was transferred from primary reinforcers to social reinforcers.

Selecting behaviors that may be maintained by natural maintaining contingencies may also allow for language to come under the control of natural social reinforcement contingencies and not necessarily access to preferred items alone (Stokes & Baer, 1977). McGee, Almeida, Sulzer-Azaroff, and Feldman (1992) taught typical preschoolers to function as a peer tutor and implement incidental teaching strategies to increase social interactions of a child with autism (i.e., "target child") during play periods. Peer tutors were provided with a target child's highly preferred items to encourage social initiations. When the target child initiated toward an item, the peer tutor prompted the child to request the item and delivered the item contingent upon the request. The target children increased requests to peers during play, and the results suggest there were positive, collateral changes in reciprocal social interactions. That is, children with autism increased their initiations and responses to peer tutors, although there were no programmed contingencies for responses, and peer tutors increased their initiations and responses to children with autism, although their initiations were not targeted. This spread of effects from incidental teaching to other social behaviors suggests that responding came under the control of peer social interactions. Furthermore, peer tutors rated the children with autism as "more likable" on a Likert-type rating scale with pictorial representations of response options following the intervention. These results highlight the benefit of incorporating peers within social interventions and suggest a framework to improve social-emotional reciprocity and the relationship between individuals with autism and their peers.

11.2.3 Training Change Agents

Given the effectiveness of incidental training procedures, caregivers and instructors should be provided with the skills to implement these instructional procedures in the child's natural setting, such as the home and school environment. Training packages that consist of a combination of instructions and performance feedback have been successfully used to train caregivers in the home setting (Hsieh, Wilder, & Abellon, 2011), preschool teachers and paraprofessionals in the school setting (Kohler, Anthony, Steighner, and Hoyson, 2001), therapists in the clinic setting via telepractice (Neely, Rispoli, Gerow, & Hong, 2016), and peer tutors within a play context (McGee et al., 1992).

Although there are effective instructional methods to train change agents to implement incidental teaching techniques, one difficulty that

instructors may face is identifying the types of environmental arrangements that are likely to influence child response. Kohler et al. (2001) noted that all four of the teachers that participated in the training evaluation had difficulty identifying techniques to facilitate social interactions for preschoolers with ASD. However, once this critical step was acquired, social interactions increased. Thus, future research may consider training programs designed to specifically improve change agents' discrimination of effective versus ineffective environmental arrangements by categorizing learner affective behavior as favorable or unfavorable dependent upon the strategy employed.

11.2.4 Clinical Implications

Incidental teaching is facilitated by first arranging the environment to evoke learner initiations under the control of naturally occurring stimuli, often by restricting access to preferred items. However, any arrangement which entices the learner to indicate an interest is suitable and may also include (a) offering small or inadequate portions of preferred items, (b) providing choice-making opportunities, (c) creating situations in which the learner needs assistance, and (d) creating unexpected situations (McCormick, 2014).

Regardless of the strategy employed, the social teacher (e.g., instructors, parents, peers, clinicians) should take care to ensure that the environmental arrangement introduces a naturally occurring cue and arranges a positive reinforcement contingency (e.g., access to an activity or item) rather than a negative reinforcement contingency where the child responds to terminate a demand. For example, an instructor may briefly interrupt play by removing a toy with which the child is engaging, the child requests the toy, and the instructor returns the toy. If the toy is removed in a manner that is analogous to turn-taking or other naturally occurring situations, when brief interruptions in play are components of engagement with the item, then this is consistent with the process of incidental teaching since the instructor is teaching the learner to engage in a response that *provides access* to preferred stimuli and is congruent with the natural environment. However, if the play is obtrusively interrupted, the instructor is then teaching the learner to engage in a response that *returns access* to preferred stimuli. In both contingencies, requests may increase under respective antecedent conditions, but a potential disadvantage in the latter is that the learner may begin to avoid the instructor if this is the primary type of teaching interaction. Similarly, previous research suggests that when instructors prompt responding (e.g., naming toy color) upon initiation of toy play, rates of toy play decrease, suggesting that adding a response requirement at the beginning of a target response may function as a punisher (Heal & Hanley, 2011).

In summary, the research base suggests a multitude of strategies to entice requests and prompt elaborations; the correct strategy is dependent upon the individual learner and their current preferences and conditions. Thus, a critical feature of incidental teaching is that instructor must notice and respond to the learner's behavior at each stage of the teaching process. The instructor must discriminate between effective and ineffective environmental arrangements based upon learner responding. To notice and respond to each child initiation, careful attention to the learner is required. Additionally, the instructor must assess the learner's skill set and current response to set an appropriate criterion for target responses during any given incidental teaching interaction. For example, it would be incorrect to prompt a learner to vocally request using adjective-noun phrases if the learner's repertoire does not include single words; rather, the instructor might start with one-word requests if the learner has a vocal repertoire. Similarly, the specific social behaviors targeted for teaching are dependent on the child's current repertoire and general knowledge of the domains and progressions of social behavior in typical and atypical development (McGee, Feldman, & Morrier, 1997).

11.3 Key Recommendations and Conclusion

While the theory and the procedures are relatively simple, the implementation of incidental teaching can be somewhat difficult and effortful. Our recommendations are set within the context of evidence-based practice in applied behavior analysis as described by Slocum et al. (2014). That is, research evidence is integrated with client values and clinical experience and wisdom. We have divided our recommendations into four specific areas of our experience that tend to be points of difficulty for clinicians serving children with autism.

11.3.1 Big Picture and Little Picture

Merriam-Webster's Dictionary defines the "big picture" as something "that gives the entire perspective" (Big picture, n.d.). With respect to treatment, Leaf (2016) cautioned clinicians to be mindful of the big picture when addressing the details (little picture) of treatment. In the case of social skills, the big picture is the development and maintenance of meaningful and fulfilling social relationships; the little picture is comprised of the momentary goals within a teaching interaction. In actuality, incidental teaching can both sabotage and help achieve the big picture goals. On one hand, each individual behavior that is taught can contribute to the development of relationships; on the other hand, because teaching is a relationship itself, unskilled management of the incidental teaching interaction can create poor relationships. For example, imagine if Devon's cousins required him to ask for the controller and spent several minutes correcting his pronunciation before they gave him the controller and his father also repeatedly asked for clearer pronunciation when prompting his bids during playtime. Typically, this type of interaction is done with the best of intentions and can be appropriate under certain conditions. For example, his interest in playing could be used to increase the accuracy of his articulations. But the goal in the example given is not to improve articulation; it is to increase social interactions and nurture his relationship with his family. In this case, the response demand may be greater than the value of the reinforcer (i.e., too much talking to get the ball), or it could alter the value of the reinforcer (i.e., too much talking delays the onset of the event, and it ceases to be a reinforcer). At the same time, there is the potential for embarrassment and social stigma on the part of the cousins or Devon. In fact, such circumstances are more likely to function as an aversive event and cause Devon to *move away* from the social interaction with his cousins. The big picture is lost over the little picture. In Devon's case, it might be more helpful to work on articulation in other instructional contexts where social behaviors and outcomes are not the primary goals.

Along the same lines, imagine two siblings on the floor playing with a block activity together and steadily increasing interactions and prolonging engagement. The big picture goal of any incidental teaching interaction in this scenario would be to continue and expand the interactions. In this case, the clinician must be mindful of what opportunities would most likely maintain the flow of interaction and not produce interruption. For example, the clinician could offer the sibling a bucket of additional figurines that would interest both children and be easily incorporated into the activity. The sibling could make access to the figurines contingent on an elaborated social response. Such management of contingencies has shown to be facilitative, rather than impeding of social outcomes (McGee et al., 1992).

It is often helpful to have a team to maintain perspective as to the validity of the ongoing procedures and outcomes of the teaching process. Stakeholders in the child's life constitute the social partners, informants, and collaborators for the child's well-being (e.g., family, peers, teachers, supervisors, community members) and can provide a rich source of perspective in balancing the social validity of the momentary and long-term goals (Fawcett, 1991; Lucyshin, Dunlap, & Albin, 2002; Wolf, 1978).

11.3.2 Learners with ASD Have Restricted Activities and Interests

The genesis of incidental teaching was with children who had language difficulties. Those children also had relatively typical interests and activities that functioned as reinforcers. ASD is a pervasive disorder. Not only are communication and social domains affected, but learners with ASD also have atypical, limited and uncommon activity engagement and preferences. This can present several challenges within the incidental teaching context, the first being that there has to be a preference (i.e., a potential reinforcer) that the instructor can use to help the learner progress. In the case of learners with ASD, this may mean that specific procedures will be needed to expand activities and interests (Alai-Rosales, Zueg, & Baynham, 2008; Leaf et al., 2012).

Second, although incidental teaching is a specific set of instructional procedures, it is important to note that several extensions have been specifically developed for individuals with ASD and come under the umbrella category of "Naturalistic Developmental Behavioral Interventions" (Schreibman et al., 2015). Each of these naturalistic procedures was developed in specific contexts (e.g., ages, settings, populations) and incorporated with specialized procedures regarding the instructional conditions (e.g., availability, arrangement, and presentation of antecedent stimuli), the response forms (e.g., progressions, extensions, and configurations), and consequences (e.g., timing, progression, and topographies). Furthermore, they are specific to ASD and are empirically validated (Schreibman et al., 2015). In every case, the naturalistic models were developed in ways that specifically addressed the unique motivational arrangments required for children with atypical and resticted interests.

Finally, due to the pervasive nature of the disorder, it is likely that incidental teaching will constitute one of many instructional arrangements over the course of a learner's clinical or education experiences. That is, the learner's success will depend on concurrent instructional programming across domains, settings, formats, and models. The particular progressions and selections should be dependent on the child's interests, progress and well-being (Alai-Rosales & Zueg, 2010).

11.3.3 Happy Progress

Happy progress is perhaps our most important recommendation. Incidental teaching is in the class of instructional strategies that are considered "sensitive and responsive interactional practices" (Division for Early Childhood, 2014, p. 14). The Council for Exceptional Children, Division for Early Childhood (2014), offers practices to support socially responsive interactions. These fit both pragmatically and conceptually with what we have presented here in the context of incidental teaching. They recommend that instructors observe and respond contingently to the range of a child's affective responses and adjust instruction accordingly, that instruction is arranged to increase learner initiations in the context of naturally occurring activities, that the consequences are natural and related to the child's interests and preferences, and that the instruction progresses in tandem with the child's growing skills. Throughout the chapter, we have illustrated through our conceptualizations, examples, and evidence the support for these recommendations as they relate to incidental teaching. We end this chapter by recommending "happy progress" as the criteria for determining the ongoing success of incidental teaching procedures. "Happy progress" means the arrangement of positive reinforcement contingencies, clearly signaled by the learner's happy and un-coerced initiations, consequated by natural, response-specific reinforcers, and occurring in the context of progressively more complex competence across behaviors, social partners, and situations over time.

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