

Incidental Teaching: A Not-Discrete-Trial Teaching Procedure

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Discrete-trial instruction is so widely used in autism treatment that many regard it as synonymous with behavioral intervention. However, applied behavior analysis is not defined by any single intervention procedure. Although discrete-trial training has been found effective in building language and other skills for young people with autism (Lovaas, 1977, 1981; Wolf, Risley, & Mees, 1964), it is only one of many science-based procedures that may be used to promote verbal and other behavior, and it has certain limitations. Indeed, the structured learning environment in which discrete-trial instruction typically occurs may fail to promote generalization of skills across situations (Anderson, Taras, & Cannon, 1996). Children may display better performances in the therapy room than in other locations, and their responses may be dependent upon prompts delivered by adults. Perhaps this occurs because, in typical discrete-trial training, the adult gives an instruction or asks a question, then the child responds or does not respond, receives or does not receive a reward, and waits for the adult to begin another trial. Waiting is part of a response chain that is repeatedly rewarded, thus diminishing the likelihood that youngsters will initiate social exchanges (McClannahan & Krantz, 1997). Researchers, however, have identified other behavioral procedures that promote generalization and spontaneous use of emerging skills, such as time-delay procedures (Charlop, Schreibman, & Thibodeau, 1985; Charlop & Walsh, 1986), video modeling (Charlop & Milstein, 1989; Krantz, MacDuff, Wadstrom, & McClannahan, 1991), scripting conversation and fading scripts (Krantz & McClannahan, 1993, 1998), and incidental teaching (Hart & Risley, 1968; McGee, Krantz, Mason, & McClannahan, 1983). This chapter focuses on the latter.

Incidental teaching has been part of the behavior analysis armamentarium for more than three decades. Hart and Risley (1968) found that traditional group language instruction failed to promote economically disadvantaged

preschoolers' use of color-noun combinations (e.g., "yellow banana," "blue car") during free play, but when access to snacks and play materials was made contingent upon color naming, the children's spontaneous use of color descriptors and nouns increased. Significantly, the children's spontaneous use of color descriptors generalized to new color-noun combinations and maintained when access to materials was no longer contingent on their use. The investigators concluded that contingent access to snacks and play materials is a more powerful reward than the praise teachers delivered during traditional instruction, and that naturalistic consequences promoted generalization of new skills.

Definition of Incidental Teaching

In 1982, Hart and Risley wrote, "Incidental teaching is used to get elaborated language by waiting for another person to initiate conversation about a topic and then responding in ways that ask for more language from that person" (p. 5). The steps in incidental teaching include (1) arranging a setting that contains materials of interest to the child; (2) waiting for the child to initiate an interaction about an object of interest; (3) asking for more elaborate language, or approximations to speech; and (4) providing the object for which the child initiated.

Children's initiations reflect their current language repertoires. Children who have acquired productive language may initiate for items or activities with phrases ("Go car ride"), labels ("Video"), or approximations to words (e.g., saying "/m/" to signify "more"). However, even children who are not yet verbal can initiate by reaching for, pointing to, or gesturing toward activities or objects of interest, and are therefore candidates for incidental teaching. A toddler who

has not yet acquired verbal imitation skills reaches for a toy, the adult models some sounds that are often heard when the youngster babbles, the child vocalizes, and the adult provides the toy. When a 2-year-old reaches for a bottle of juice, her father briefly holds her hand; provides a verbal model ("oo—juice"); after the youngster imitates "oo," the parent confirms that her response is correct by repeating "oo—juice"; and then provides the juice bottle. A preschooler who has learned to imitate words points to a cookie; the parent requests, "Say 'cookie'"; the child imitates; and the parent gives him the requested item.

Initially, use of incidental teaching for children with autism appeared limited by their severe language and social-skill deficits, but in 1983 McGee et al. demonstrated the effectiveness of a modified incidental-teaching procedure in teaching two youths with autism to receptively identify objects used during daily school lunch preparation. Because the participants had very limited expressive language skills, adults' requests for elaboration consisted of requests for specific items (e.g., "Give me relish"). The participants' new receptive language skills generalized to another room of their group home and to a different time of day.

In a comparison of incidental teaching and discrete-trial instruction, children with autism displayed more spontaneous use of prepositions taught through incidental teaching than through discrete-trial instruction, and incidental teaching promoted greater generalization from the classroom to a free-play setting (McGee, Krantz, & McClannahan, 1985). These studies demonstrated the effectiveness of incidental teaching in building new language skills for children with autism.

How Incidental Teaching Differs from Discrete-Trial Training

There are several procedural differences between discrete-trial instruction and incidental teaching. In discrete-trial instruction, the teacher or parent initiates teaching by asking a question or giving a direction (e.g., "What's this?" or "Point to the ball"). Incidental teaching begins with a child's initiation for materials, an activity, or a conversational topic that is, at that moment, highly preferred. Discrete-trial instruction typically occurs in a structured learning environment in which furniture and materials are carefully arranged to promote attending, whereas incidental teaching is conducted in the child's natural environment (e.g., in the kitchen, family room, car, or backyard). The instructional materials and rewards used in discrete-trial sessions are selected by the instructor, and may be unrelated to the learning activity; for example, a child may be given a cracker after correctly labeling a picture of a car. In incidental teaching,

the materials are selected by the child and the rewards are the materials for which he initiated; for example, the child initiates to go out by struggling to open the door, and after he responds to the request to say "Open please," the parent opens the door and allows access to the outside play area.

We do not suggest that discrete-trial instruction be abandoned in favor of incidental teaching. Insufficient attention has been given to the fact that these approaches teach different types of verbal behavior. Discrete-trial instruction typically teaches tacting, or labeling (e.g., answering questions such as "What is this?"), whereas incidental teaching usually addresses mand training, or requesting (e.g., "Help me" or "Turn on TV"). Research shows that both are effective for teaching expressive and receptive language skills to children with autism, and both are important components of a language curriculum (Reichle & Keogh, 1985; Sundberg & Partington, 1999).

How To Prepare for Incidental Teaching

Although incidental teaching begins with a child's initiation, advance planning can promote the development of new language skills. Preparation for incidental teaching includes identifying specific language targets, providing materials and activities that are of interest to the child, and arranging or manipulating materials in ways that attract the child's attention.

Identify Instructional Goals

When selecting target skills, it is important to consider a child's current language repertoire. Incidental teaching should help the child take the next steps, but must not request skills that are presently beyond his or her reach. Using incidental teaching, we have helped children acquire receptive object labels, approximations to expressive labels (i.e., initial sounds or phonemes), nouns, adjectives (e.g., color, size, shape, quantity), prepositions, pronouns, phrases and sentences, correct articulation, improved voice volume and prosody, question asking (e.g., "Where is my _____?"), skills in requesting assistance (e.g., "Help me open it"), responses to yes/no questions, and sight-word reading repertoires (McGee, Krantz, & McClannahan, 1986).

Teaching is more effective and children progress more rapidly if teachers or parent select one or only a few language skills at a time, rather than attempting to teach multiple responses. For example, a teacher might initially target the pronouns *I* and *you*, and reserve instruction on the use of other pronouns until the child masters these.

Children do not need any prerequisite skills to benefit from incidental teaching. The procedure is effective for shaping new language skills even before children learn to imitate

verbal models or follow adults' directions. A child who initiates by pulling an adult toward the refrigerator, guiding a parent's hand toward a preferred object, or reaching for a favorite toy presents many opportunities for incidental teaching. An initial instructional goal might be a receptive label ("Point to the refrigerator") or an affirmative head nod ("Do you want _____?").

Arrange the Environment

Opportunities to conduct incidental teaching can be maximized through careful planning and arrangement of children's usual environments. Put favorite snacks, toys, books, videotapes, or games on high shelves, on countertops, or in tightly closed transparent containers where they are visible but out of reach or otherwise inaccessible to the child.

Promote Initiations

Children's initiations reflect their current language skills. Children with autism who have not yet acquired expressive language may initiate by pointing to or reaching for objects, attempting to open doors or containers, or taking an adult's hand and leading him or her to an object of interest. Children with limited verbal skills may initiate by vocalizing or approximating a word (e.g., saying "/m/" for *milk*), and those who have acquired more expressive language may initiate by labeling ("Milk") or by using phrases ("Want milk") or sentences ("I want milk").

Many children with autism initiate without any special training or environmental arrangements, but more teaching can be accomplished by displaying materials that interest the children and presenting them in ways that are likely to evoke initiations. For example, a father might give a youngster a small amount of a favorite snack food or a few construction toys, but control access to the main containers by putting foods or toys in transparent bins that she is unable to open, thus setting the occasion for her to initiate by attempting to open the tightly closed lids. Similarly, if a mother plays with her son's favorite computer game, he may initiate for a turn by climbing on his mother's lap or grabbing for the mouse. Many children enjoy repetitive play activities such as building block towers and watching them fall, or rolling marbles down a ramp. After the tower topples or the marble arrives at the bottom of the run, children may initiate by reaching for materials. The parent can also increase initiations by removing parts or temporarily disabling toys or games. A child who independently completes puzzles may initiate by asking for a piece that is not visible. If a child enjoys listening to music on a CD player, the parent might remove the battery to encourage a request for assistance. After the parent identifies activities that a child enjoys but never requests (e.g., making popcorn or roller skating) and makes available photographs of those activities, the child who has acquired picture-object correspondence skills may request activities

although materials are absent, by pointing to or handing over pictures, or by asking for depicted toys or snacks. When playing a favorite song on the piano or blowing bubbles with a child, the parent can occasionally stop and provide an opportunity for the child to initiate for the continuation of the activity by reaching toward the keyboard or saying "More."

Parents who are busy with housekeeping and childcare often help with self-care tasks before children initiate. A parent might quickly tie the shoes of a typically developing preschooler so that he can run to the playground; however, for a child with autism, an initiation for help with shoe tying may be an opportunity to teach functional language. The parent can promote an initiation by momentarily detaining the child, glancing at her untied shoes, and giving her an expectant look. If she reaches for the parent's hand, the parent should ask, "What do you want?" and tie the child's shoes after she says "shoes" or responds to the verbal prompt (e.g., "Say, 'tie shoes'"). Mealtimes also provide regular opportunities for incidental teaching; moving the bowl of french fries closer but slightly beyond a child's outstretched arm is likely to gain the child's attention. If the parent waits, the child may initiate by saying "fries" and the parent will have an opportunity to teach by requesting the more elaborate response, "french fries, please."

We have suggested eight ways for adults to increase children's initiations: (1) control access to materials; (2) play with toys that are of special interest; (3) set up repetitive play situations; (4) withhold materials needed to pursue activities; (5) display photographs of preferred activities; (6) begin favorite activities, then pause; (7) glance at the materials, then look expectantly at the child; and (8) move the materials closer to the child. This list can be expanded, and we encourage caregivers and professionals to do so.

How To Do Incidental Teaching

It is exciting when new language skills emerge, and adults are especially pleased when young people with autism display spontaneous language. Use of the following procedures can help children attain this goal.

Wait for an Initiation

As previously mentioned, incidental teaching occurs only when children initiate for items or activities. Adults may arrange the environment and manipulate materials in ways that may evoke initiations; they may also promote initiations by making eye contact with the child and smiling with raised eyebrows (the "expectant look"). Ultimately, however, adults must wait for an initiation. Using verbal prompts (e.g., "What do you want?") quickly converts the activity to discrete-trial training.

Request Elaborated Language

After the child initiates, the adult's request for a more elaborate response should cue the child to display the language skill that has been identified as the goal of instruction. For example, when a child who is learning to imitate phonemes reaches for a ball, the teacher moves the ball beyond his reach, models the initial consonant /b/, and provides access to the ball only when the child imitates the target sound. Later, sounds can be combined to approximate labels (e.g., "Say, 'So-da'"), labels can be expanded to phrases (e.g., "Say, 'Coke please'"), and phrases expanded to sentences or questions (e.g., "Say, 'Can I have a drink?'"). If a child reliably makes requests, the adult can encourage a different language skill, such as using a possessive pronoun (e.g., "Whose shoes should I tie?").

Requests for elaboration are prompts. Some requests for elaboration, such as "What do you want?" or "Is something wrong?" are quite general, and do not indicate correct responses. If the child does not respond or responds incorrectly, the adult then provides a more specific request (prompt), such as "Say, 'I want the big cracker'" or "Say, 'Where are crayons?'" These are examples of a least-to-most prompt procedure, which is more likely to produce errors than a most-to-least prompt hierarchy, but less likely to provide assistance that the child does not need (see Chapter 4). In a most-to-least prompt sequence, the adult begins with a complete prompt or models exactly what the child should do or say (e.g., manually guides the child to point to a target object or requests, "Say, '____'"), and only in later incidental teaching episodes are these very specific prompts replaced by more general requests for elaboration. The decision about whether to use most-to-least or least-to-most prompt procedures is based on the child's language repertoire and on data based on his or her performance.

Provide the Object for Which the Child Initiated

After an adult requests an elaboration (e.g., "What do you want?"), a child may (a) make the expected response, (b) give an incorrect or incomplete response, or (c) make no response. If a child provides a correct elaboration, the adult confirms that she is correct and immediately provides the object of interest (e.g., "Oh, you want milk. Here it is"). If the child does not respond correctly, the adult models the correct response (e.g., "Say, 'Milk, please'") and delivers the item if the child imitates the verbal model. Incidental teaching occurs only if the adult provides the item for which the child initiated. If a youngster points to candy, responds to a request for elaboration, and is given raisins, incidental teaching has not occurred. Some examples of incidental teaching programs are shown in Table 6.1.

Collect Data

The most important data about the effects of incidental teaching are not what a youngster does during incidental teaching episodes, but whether the child uses the target language skills spontaneously, in relevant contexts, and in situations in which teaching has not occurred. After a parent has used incidental teaching to help a toddler say /m/ for *milk*, for example, it is important to observe whether she displays her new verbal approximation when the parent has not arranged the environment in any special way, when the parent is not providing teaching, and when the child encounters milk in new situations, such as at a restaurant or a grandmother's house.

We recently taught prepositions to several boys, ages 6 to 11, by arranging preferred snacks in relation to transparent plastic containers, and using elaboration requests such as "Where are the raisins? Say, 'The raisins are *on top of* the box.'" Then we gradually faded the request for elaboration ("Say, 'The Fig Newton is *beside* the box'") in a most-to-least prompt-fading sequence. When our data about a child's performance in the specially arranged environment showed that he correctly responded to general requests for elaboration ("Where are the ____?"), we went to the classroom, put a pencil on top of, under, beside, and behind his notebook, and asked "Where is the pencil?" Some of the boys did not use correct prepositions when they encountered different target objects in a different environment. Subsequently, we taught prepositions in the classroom, placing preferred toys on, beside, under, and behind notebooks, desks, and bookcases. Later, we measured preposition use on the playground, where we placed Nerf balls, Frisbees, bikes, and soccer balls on, under, beside, and behind picnic table, slide, fence, tree, and so on, and asked, "Where is the ____?" When we collected data on the boys' responses to untrained stimuli on the playground, all scored 80% to 100% correct on each target preposition, and we concluded that we could now identify some new language goals to be addressed with incidental teaching. A specific incidental teaching program is completed when the data document that the child displays new language skills in contexts that were never used during teaching.

Find Alternatives for Problem Behaviors

If a child displays problem behavior during incidental teaching, the adult should interrupt instruction and direct the youngster to another activity, or use procedures that have previously been effective for reducing inappropriate behavior, but should not provide the item for which the child initiated. A child who receives preferred snacks or toys while having a tantrum may learn that crying and screaming are effective ways to communicate with others. Incidental teaching is a set of procedures for teaching

Table 6.1
Examples of Incidental Teaching (*Continued*)

Requesting Missing Items	
Target response	Asking for a missing item (e.g., "I can't find my ___" or "Where's the ____?").
Prerequisite skills	Requests objects with a noun or phrase. Imitates verbal models of three to five words.
Environmental design	Remove some of the materials needed to complete activities. For example, take the crayons out of the box, or the CD player out of the carrying case.
Child's initiation	The child searches through his desk drawer and says "Crayons."
Request for elaboration	Respond to the child's initiation with a question (e.g., "Is something wrong?") that calls for a description of the problem. If she does not respond, provide a verbal model of the target statement (e.g., "Say, 'Where are crayons?'").
Provide the object for which the child initiated	After the child responds with the target statement, confirm that her response was correct (e.g., "Oh, you can't find your crayons. I'll help you look for them.") and produce the missing items.

functional language skills that are appropriate alternatives to tantrum behavior.

How To Teach Others To Do Incidental Teaching

Although research on incidental teaching has demonstrated its effectiveness in promoting generalization and spontaneous use of receptive and expressive language skills, parents and professionals often find that training materials are not readily available. Hart and Risley's (1982) monograph, *How To Use Incidental Teaching for Elaborating Language*, provides detailed instructions on how to do incidental teaching with typical children and children with language delays. It includes examples of incidental teaching episodes in home and school settings, and offers suggestions on how to respond when problems are encountered.

In 1988 MacDuff, Krantz, MacDuff, and McClannahan investigated a brief training procedure for group home staff who served children with autism. During five 30-minute training sessions, trainees received written materials consisting of (a) a list of the steps in incidental teaching, (b) written examples of incidental teaching episodes, (c) a form on which trainees wrote their own incidental teaching episodes, and (d) a description of ways to evoke child initiations. During training, the number of written examples of incidental teaching episodes systematically decreased and the number of episodes written by trainees increased. This time-effective training program increased the trainees' use of incidental teaching, and their skills generalized across materials, group home settings, children, and group size.

At the Princeton Child Development Institute, we deliver both didactic training and ongoing hands-on training to help staff members and parents acquire incidental teaching

repertoires, and we assess staff members' skills using the procedures identified by MacDuff et al. (1988). Four components of incidental teaching are scored as present or absent (see Figure 6.1). An initiation is recorded if the child reaches for, points to, gestures toward, labels (or approximates a label), or verbally requests an item or activity. Observers record initiations by writing the name of the item or activity on the data sheet. A request for elaboration is scored if the instructor requests a verbal or nonverbal response (e.g., "What color is the M&M?" or "Point to the yellow M&M") that is contextually related to the item for which the child initiated. Repeated requests that are not separated by praise or verbal models, and instructions that address problem behavior (e.g., "Hands down") are not scored as requests for elaboration. Elaborations are scored as present if the child provides the requested response, either with or without the instructor's prompts. Providing the requested item is scored if the instructor gives the child the item for which he or she initiated (a) after the child makes a more elaborate response, (b) before the conversational topic changes, and (c) in the absence of stereotypy and disruptive behavior. An incidental teaching episode is defined by the presence of all four components.

Data on staff members' use of incidental teaching are collected during specified activities and times, and interobserver agreement between trainers or evaluators is typically at generally acceptable levels. Without specific training and regular evaluation, it is our experience that incidental teaching is rarely delivered by the majority of intervention personnel (McClannahan & Krantz, 1993).

Summary

Although highly structured discrete-trial training is unquestionably necessary for teaching children with autism to

Data Sheet: Assessing Instructors' Use of Incidental Teaching

Component

Item/activity for which the child initiated	Did the instructor prompt, model, or request an elaboration?		Did the child respond with more elaborate language?		Did the instructor provide access to the item or activity for which the child initiated?	
	Yes	No	Yes	No	Yes	No
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 6.1. Data sheet used for assessing instructors' use of incidental teaching. Note. From "Providing Incidental Teaching for Autistic Children: A Rapid Training Procedure for Therapists," by G. S. MacDuff, P. J. Krantz, M. A. MacDuff, and L. E. McClannahan, 1988, *Education and Treatment of Children*, 11, pp. 205-217. Copyright 1988 by Gregory S. MacDuff. Reprinted with permission.

attend to teachers and materials, to follow instructions, to engage in verbal imitation, and to respond to questions, stimulus control of verbal behavior often fails to transfer from adult-presented instructions and prompts to people, objects, and activities in the natural environment. Incidental teaching, originally used with economically disadvantaged preschoolers, was modified to provide language instruction to children with autism, and research showed that these procedures promoted the generalization and spontaneous use of language. Some evidence indicates that incidental teaching reinforces social interaction responses beyond those specific skills that are the targets of teaching (Farmer-Dougan, 1994; McGee, Almeida, Sulzer-Azaroff, & Feldman, 1992) and contributes to overall increases in language use. Talking more appears to result in using more complex and elaborate language (Hart & Risley, 1980).

Although incidental teaching begins with a child's mand (e.g., a request for a preferred snack or toy), it can be used to teach a variety of language skills, such as use of articles ("Say, 'an apple'"; "Say, 'a book'"), use of adjectives ("Do you want spicy chips or salty chips?"), and question asking ("Say, 'Where is the truck?"). The breadth of incidental teaching is related to careful identification of target responses, environmental arrangements that promote initiations and instruction, and advance specification of elaboration requests.

Adults who provide language instruction to children with autism must design learning environments and use teaching procedures that promote spontaneous use of emerging language, and that maintain verbal behavior through naturally occurring contingencies. Incidental teaching is helpful in achieving these goals, and we hope that the reader will put it into practice, thereby adding a powerful tool to behavioral intervention programs.

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