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Commentary: Interventions to Facilitate Socialization

Patricia J. Krantz[1]

Normative data on 42 one- and two-year-old typical American children indicate that even before the children learned to talk "they had learned the social skills fundamental to interaction. They were adept at getting and holding their parents' attention, taking turns, and maintaining interaction by cooing, smiling, and babbling" (Hart & Risley, 1999, p. 36). It is precisely those communicative responses (as well as contextual verbal behavior) that are often underrepresented or absent from the repertoires of children with autism. Some have hypothesized that these behavioral deficits derive from neurophysiology (Lovaas & Smith, 1989) or from the "tendency to escape and avoid tactile and auditory stimuli" because of "abnormalities in sensory equipment" (Bijou & Ghezzi, 1999, pp. 34–36). Whatever the etiology of autism, early behavioral intervention is important (Jacobson, Mulick, & Green, 1998; New York State Department of Health, 1999). By the age of 60 months, some (or perhaps many) of children's socialization deficits may no longer be attributable to physiological factors but to the absence of early intervention or the selection of ineffective intervention approaches and the rejection of effective strategies.

Many early efforts to promote the socialization skills of children with autism were based on discrete-trial instruction. Although this paradigm was (and is) effective in building verbal repertoires, it may bring social interaction under very specific stimulus control—control by others' verbal instructions and verbal prompts. In discrete-trial training, an adult gives an instruction, the child follows (or does not follow) the instruction, the adult delivers (or does not deliver) a reward, and the child waits for the next trial to begin. Behavior other than passive waiting delays the next trial and the next reward. Thus, both passive waiting and adults' verbal instructions may become discriminative for reinforcement (McClannahan & Krantz, 1997). The results of this type of stimulus control are familiar to many practitioners—children readily provide previously trained answers to questions and dependably respond to the instruction "Say ———," but rarely initiate interaction or display unprompted speech, except to request preferred items and activities (e.g., "I want ———"). Furthermore, discrete-trial training usually does not provide good models of the give-and-take of ordinary conversation, nor does it promote varied or novel responding.

Incidental teaching, originally based on studies of economically disadvantaged children (Hart & Risley, 1968, 1974), was designed to elaborate spontaneous speech by waiting for a youngster to initiate conversation, requesting more language, acknowledging the child's elaboration, and providing the item or activity for which he or she initiated interaction. When this approach was extended to young people with autism, it was initially modified to compensate for anticipated deficits in initiations (McGee, Krantz, Mason, & McClannahan, 1983). However, later investigations indicated that relatively simple environmental modifications could evoke frequent initiations. Incidental teaching procedures have been shown to promote the generalized and spontaneous use of target language skills (McGee, Krantz, & McClannahan, 1985) and to enhance social interaction responses that were not the targets of training (Farmer-Dougan, 1994; McGee, Almeida, Sulzer-Azaroff, & Feldman, 1992).

Some investigators have noted that incidental teaching (or "natural environment training") maximizes opportunities to teach mands or requests (Sundberg & Partington, 1999). However, although incidental-teaching episodes may begin when children initiate interaction to request items of interest to them, these procedures may (especially with advance planning) address many different aspects of grammar, prosody, and conversational competence (Fenske, Krantz, & McClannahan, 1999).

Peer-mediated interventions have achieved some favorable results that deserve further investigation, but the maintenance and cross-setting generalization of social interaction skills have been difficult to achieve with

[1] Princeton Child Development Institute, 300 Cold Soil Road, Princeton, New Jersey 08540.

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these procedures. When typical peers are trained to initiate interaction with children with autism, the latter's responses increase, but their initiations may remain unchanged or may even decline (Odom, Hoyson, Jamieson, & Strain, 1985). Prompts and rewards delivered to tutors and tutees by teachers may produce atypical interaction episodes, prevent stimulus control from transferring from the teacher to peers, and make social exchanges susceptible to extinction when prompts and rewards are withdrawn (Odom & Strain, 1986). Thus, future research should examine strategies for fading prompts and strategies for fading or avoiding contrived, teacher-delivered rewards.

Our own research has taken us at least one step in this direction. We have investigated the effects of written or audiotaped scripts that were systematically faded from end to beginning to teach peer interaction and child–adult interaction. In the first of these studies (Krantz & McClannahan, 1993), written scripts were used to teach four children with autism, ages 9 to 12, to initiate conversation with peers about recently completed, current, and future activities. When the scripts were introduced, initiations and responses increased; and as the 10 scripted statements and questions were faded from last word to first word, unscripted initiations increased—that is, the youngsters displayed spontaneous, generative language. After scripts were faded, the participants' levels of peer initiations were in the same range as those displayed by a normative sample of three nondisabled youngsters.

In the second study (Krantz & McClannahan, 1998), three preschoolers with minimal reading skills were taught to use the textual cues "Look" and "Watch me" to initiate conversation with a familiar teacher, who did not ask questions or give directions, but responded with statements that were (hopefully) at the participants' language levels and of interest to them. The written scripts were faded in three steps, from end to beginning, by successively cutting away portions of the cards on which they appeared. After scripts were faded, unscripted interactions not only continued but generalized to activities that had not been the topic of teaching. Finally, in the third investigation (Stevenson, Krantz, & McClannahan, 2000), audiotaped scripts were introduced and then faded to teach four adolescents with autism, who had minimal reading skills, to converse with a target adult. As audiotaped scripts were faded from end to beginning, unscripted statements and questions increased.

In these three studies, verbal prompts were minimal or absent, prompt-fading procedures were specified, and teacher-delivered rewards were available only after sessions concluded. Script-fading procedures enabled young people with autism to practice conversational turn taking and to contact others' language models in contexts that encouraged a variety of verbal responses and that did not feature the instructions and questions that are typical of discrete-trial training.

Properties of social interaction that are designated as "qualitative" may point to variables that have not yet been adequately defined or measured. The affective and prosodic characteristics of social exchanges are examples of repertoires that have not received sufficient scientific attention. Indeed, in the first 30 volumes of the *Journal of Applied Behavior Analysis*, there is only a single study of procedures for training affective behavior to young people with autism (Gena, Krantz, McClannahan, & Poulson, 1996). Although it is well-established that gestures play an important role in social interaction and that people with autism use gestures much less often than people with mental retardation, language delays, or typical development, there are few investigations of procedures to teach gestural communication (Buffington, Krantz, McClannahan, & Poulson, 1998). Similarly, prosody is rarely mentioned in the behavioral literature, and language intervention curricula for children with autism typically do not include procedures for teaching intonation, pitch, rhythm, or pauses, perhaps because of the absence of research to support such programs.

As scientists, regardless of theoretical bent, we are responsible for defining and measuring all of the relevant components of social interaction and all of the relevant variables associated with intervention, including procedures for fading prompts and programming generalization. As practitioners, we are responsible for shaping relevant prerequisites to conversation, such as generalized imitation skills and nonverbal initiations for children who are not yet verbal, and for generating expressive language repertoires. Standards of "best practice" are urgently needed and should be based on evidence about the effects of various intervention procedures, as well as on objective measures of treatment outcome.

As scientists and as practitioners, we can advance intervention technology by measuring not only the social interaction skills of young people with autism but also the social exchanges of their typical peers. Descriptive data on the verbal behavior of typical children and their caregivers (cf. Hart & Risley, 1995, 1999) set benchmarks that may be helpful in calibrating teachers' performances and evaluating the repertoires of children with autism. Furthermore, data on the social interaction of typical children in integrated settings may structure teaching activities for youngsters with autism

who are making transitions to those settings (Krantz & McClannahan, 1999).

Finally, we can optimize research and practice by reminding ourselves not to put all of our "eggs" (i.e., resources, hopes) in any single procedural basket. People with autism, like all of us, must learn to learn in a variety of ways: from direct instruction; from incidental teaching; from television, videotape, and computer; from parents, teachers, peers, and employers; and from pictorial, auditory, and textual cues. There are various intervention procedures, all firmly grounded in science, that accomplish these different but equally important objectives. The most important aspect of these procedures is their scientific underpinnings. The challenges are to support and promote intervention efforts that reflect the array of contemporary, empirically based procedures and to teach discriminations among scientific and unscientific approaches to treatment.

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