



# AN INTERVENTION TECHNIQUE FOR CHILDREN WITH AUTISTIC SPECTRUM DISORDER: JOINT ATTENTIONAL ROUTINES

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Virtually all children with autism are deficient in joint attentional skills. The impact of this deficit may be understood in the context of pragmatically based explanations of language acquisition. In this view, each step in the ontogeny of joint attention is consequential for language development. Thus, it is important that speech-language pathologists understand the developmental course of joint attention so that intervention may start at the earliest step possible. In this article, we review the literature on joint attention and its relationship with other rule systems of language. We discuss the ontogeny of joint attention in typical children. Finally, we describe the developmental course of joint attention as a framework for language intervention through the study of one case. © 1998 by Elsevier Science Inc.

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*Educational Objectives:* Readers will be able to explain the importance of joint attention in the development of language, and to apply a language intervention framework of joint attention with autistic children.

**KEY WORDS:** Autism; Assessment; Joint attention; Intervention

## INTRODUCTION

Autism is a pervasive developmental disorder in which individuals are impaired in their social relatedness, in their ability to imagine, and in their ability to communicate (Wing & Gould, 1979). A disturbance in communication has long been a defining feature of the disorder (see Kanner 1943; Cohen, Paul, & Volkmar, 1987). Studies of the formal aspects of language have demonstrated that, when idiosyncratic language forms are set aside, the acquisition of the phonologic and syntactic systems parallel those of normally developing chil-

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dren (see Paul, 1987; Frith, 1989, for reviews), although the rate of development is more variable. Despite this, children with autism exhibit serious pragmatic language deficits (Baron-Cohen, 1988). Consistently, they have been found to use a narrow range of communicative intentions which is exacerbated by a more serious deficit in directing and maintaining shared attention (Baron-Cohen, 1988; 1989; Mundy, Sigman, & Kasari, 1990; Rollins, 1994; Wetherby, Yonclas, & Bryan, 1989).

The deficit in shared attention has been documented for children with autism at all levels of language development. At the prelinguistic level, Curcio (1978) found that older nonverbal children with autism used acts or gestures that reflect needs or desires. They did not use acts or gestures to gain an adult's attention to an object or to direct the adult's attention toward the object. Similarly, Wetherby et al. (1989) found that despite comparable rates of communication, young prelinguistic children with autism show depressed proportions of acts to establish shared attention. Comparable results are also reported at the prelinguistic to early one-word stage of language (Mundy, Sigman, & Kasari, 1990; Wetherby, 1986). In particular, while these children were able to request objects and actions for instrumental purposes (e.g., give me, I want), they did not attempt to direct an adult's attention to themselves (e.g., look at me) or to objects (e.g., look at that). Likewise, they performed poorly in terms of correct response to shared attention (Loveland & Landry, 1986).

The impairment in shared attention is marked and persistent. Although children with autism may eventually acquire some joint attentional skills, they may do so using nonconventional language such as echolalia or excessive questioning (Hurtig, Ensrud, & Tomblin, 1982; Prizant & Duchan, 1981; Prizant & Rydell, 1984). Furthermore, high functioning children with autism who acquire multi-word combinations continue to use a paucity of communicative acts to establish and/or maintain shared attention (Rollins, 1994; Rollins & Snow, in press). Interestingly, when followed over a one- to two-year period, high functioning children with autism show a deterioration in their ability to use communicative acts to establish or maintain shared attention with their mothers (Rollins, 1994).

The impact of the deficit in establishing and maintaining shared attention is best understood in the context of pragmatically based explanations of language acquisition. In this view, pragmatic skills and, more specifically, acts used to establish and/or maintain shared attention (see Table 1 for examples) constitute the lever which children use to pry open the complexities of other linguistic accomplishments (Bruner, 1983; Ninio & Snow, 1996). Thus, children with autism who have an extraordinary problem with both of these skills, may not achieve the reciprocity and mutuality of social communication needed for the continued acquisition of vocabulary and/or syntax (Rollins, 1994; Rollins & Snow, in press; Wetherby, 1986).

**Table 1.** Order of Acquisition of Communicative Acts Used to Establish and Maintain Shared Attention<sup>a</sup>

Step	Establish shared attention	Maintain shared attention via social routines	Maintain shared attention
1	Direct another's attention to self		
2	Direct another's attention to object or event		
3	Acknowledge others call for attention		
4		Imitate	
5		Answer routine questions	
6		Supply animal sounds	
		Supply other onomatopoeia	
		Routine game	
7			Describe a joint focus
8			Discuss feelings
9			Discuss recent event
10			Discuss a nonpresent

<sup>a</sup>Adapted from Ninio and Snow (1996).

The goals of this article are to: (1) review shared attention and its relationship with other rule systems of language; (2) explicate the developmental sequence of shared attention in typical children; and (3) identify ways in which analysis of the developmental course of joint attention can inform intervention techniques for young preverbal and emerging linguistic children with autism. A framework for language intervention for children with autism will then be outlined through a study of one case.

## SHARED ATTENTION AND THE RELATIONSHIP WITH OTHER RULE SYSTEMS OF LANGUAGE

Considerable research suggests that shared attention brings forth opportunities for children to learn about language (Bruner, 1983; Ninio & Snow, 1996; Rollins & Snow, in press; Tomasello, 1995). Many researchers have looked at script-like or routine interactions between caregivers and their children. They have found that the re-occurrence of situational language enables typical children to further their language development (Bruner, 1983; Ninio & Bruner, 1978; Snow, Perlman, & Nathan, 1987). This is because the embedding of the adult talk in social routines ensures a nonlinguistic scaffold for language learning. Social routines alert the child to information that should be attended to, and define what can be presupposed (Bruner, 1995).

Researchers have looked specifically at the relationship between establish-

ment and maintenance of joint attention (Table 1, steps 2 and 7) and the influence joint attention has on the acquisition of vocabulary. Goldfield (1990) found that episodes of joint attention between children and their caregivers correlate with infant and toddler vocabulary size. More recently, experimental work by Tomasello and his colleagues (Tomasello & Kruger, 1992; Tomasello, Strosberg, & Akhtar, 1996) have found that children use social and pragmatic cues to learn new words within shared attention. Joint attention has also been found to facilitate the acquisition of syntax for young semi-verbal children (Rollins & Snow, in press).

The relationship between joint attention and later language acquisition has also been documented for children with autism. Mundy et al. (1990) found that using gestures such as pointing, showing, and eye gaze to direct another person's attention was predictive of language development the subsequent year. Rollins, Bay, and Aires (1996) found an association between the development of communicative acts used to establish and/or maintain shared attention and the development of vocabulary. Furthermore, the frequency of communicative acts used to establish and maintain joint attention was an excellent predictor of how fast high-functioning children with autism acquired new grammatical constructions (Rollins, 1994; Rollins & Snow, in press).

These findings underscore the putative relationship between shared attention and the acquisition of language. As such, these findings have important clinical and educational implications, especially for children with autism. Language interventionists need to engage children in activities that facilitate shared attention. This is easier said than done. Clinicians who have worked with these children know that engaging young children with autism in activities that require shared attention is extremely difficult. This is because children with autism can develop quite extensive instrumental use of language (e.g., protesting, refusing, and requesting) without any skill in shared attention (e.g., direct attention to self or to objects, make statements about a joint focus). Both research and clinical reports document that the development of shared attention is severely truncated in virtually all children with autism (Baron-Cohen, 1989; Wetherby et al., 1989). This is quite different from typically developing children. Recent work on the development of pragmatics in very young typical children has found communicative acts used to establish and maintain shared attention are more frequent (Snow et al., 1996) and may actually emerge before regulatory acts (Ninio & Goren, 1993). As Wetherby (1986) pointed out, over 10 years ago, the acquisition of pragmatic skills in children with autism differs from that of typically developing children. This decoupling of social communicative acts from regulatory or instrumental, acts in children with autism, implies that the developmental trajectory for shared attention is independent from other pragmatic skills. If this supposition is correct, then speech-language-pathologists must understand the developmental sequence of joint attention in order to intervene at the earliest possible step.

## DEVELOPMENTAL SEQUENCE OF JOINT ATTENTION SKILLS

To date the developmental sequence of joint attention has not been fully explicated in the literature. Recent work in developmental pragmatics suggests that (1) understanding others as intentional agents, (2) participating in social routines, and (3) attending jointly are linked developmentally. We assert that this sequence provides a logical developmental trajectory toward joint attention. We review the literature that brought us to this conclusion.

Tomasello, Kruger, and Ratner (1993) argued that the origins of joint attention may lie in the infant's emerging understanding that other persons are intentional agents. Intention "is referring to the concrete goals or purposes by which human beings guide their behavior" (Tomasello, 1995 [p. 105]). This is used in the Piagetian sense—that a child can use a means to an end. For example, a child may use a stick to retrieve a ball out of reach. In typical children, this object-oriented means-end behavior is highly correlated with the ability to use words as a means to an end (Fisher & Corrigan, 1981). For example, a child may direct the word "ball" toward another person so that the person will give him/her a ball. This more socially-oriented means-end behavior is manifested when the children are able to direct another's attention to themselves (e.g., look at me) or objects (e.g., ball) in the environment (Table 1, steps 1 and 2).

Ninio and Snow (1996) remind us that children's earliest communicative intentions are expressed primarily for two interactive goals. The first goal is to ensure mutual attention with persons in their environment. The second goal is to participate in meaningful social interactions (Table 1, steps 4, 5, and 6). These interactions are attained through context embedded speech games or routines such as peek-a-boo. These early routines facilitate children's participation in social interactions. It is important to note that early routines are often linguistically meaningless (e.g., onomatopoeia), however, their social significance is quite clear (Ninio & Snow, 1996).

The ability to maintain shared attention through social participation in routines precedes true joint attention (Table 1, step 7). Well-practiced routines, imitation, and well-rehearsed formats, of course, are much less sophisticated than true joint focus. The child who produces many acts within social routines, however, is socially motivated and has learned the value of vocal and gestural acts as a mechanism for participating in social interaction (Bruner, 1983). Once a child has learned to participate socially in contexts where there are no well-rehearsed or practiced routines to carry the interaction, we may say that this child is able to produce true joint attentional acts.

Thus far, the focus of the article has been on the important role of joint attention on language development. We have described that children with autism show a joint attentional deficit. Although these children are often capable of object-oriented means-end behavior, they have more difficulty understand-

ing that other people are intentional agents. However, this is an important prerequisite to joint attention. Research on normal and disordered development supports our contention that each component of the ontogeny of joint attention is consequential for language acquisition. Therefore, speech-language pathologists must evaluate a child's level of functioning along the developmental trajectory of joint attention, which includes assessing the ability to: (1) establish social intentionality, (2) participate in social routines, and (3) maintain joint attention. In this way we can determine the appropriate starting point of intervention.

### **IMPLICATIONS FOR THERAPY: THE CASE OF MICHAEL**

As an example of this intervention strategy, we present Michael, a 3;9-year-old child. Michael has been diagnosed as having an autistic spectrum disorder (ASD). Despite intensive intervention, he had not yet established socially oriented intentionality. We began therapy with Michael in association with the services offered to him in the Preverbal Communication Program at the University of Texas at Dallas, Callier Center for Communication Disorders. Children in the preverbal program receive intensive individualized language therapy in a classroom atmosphere four mornings a week. Each child is paired with a student-clinician so that a one-to-one ratio is maintained. The children engage in regular group activities such as music and snack in addition to individual activities tailored to each child's needs. Because of the structure of the preverbal program, we were able to integrate our goals into his existing services.

Michael was identified as being within the autistic spectrum. Michael's expressive and receptive language skills were severely delayed as were his symbolic play skills. Expressively, he used nonverbal means to communicate, such as tantrums to protest and proxemic behaviors when he wanted to engage in an interaction. Verbally, he used one-word utterances to label objects in his environment and to imitate. His labels were judged to be noncommunicative in that they did not function to direct another's attention to objects in the environment but rather simply to label. As such, they had a stimulus-response quality to them. For example, Michael always labeled numbers, letters, and vehicles, often perseveratively, without regard to his listener. Receptively, Michael did not consistently respond to his name but did understand some familiar words in the context of routines. Michael's schemes for relating to objects and play skills consisted of manipulating objects and perseverating on their movements.

As would be expected from a child with ASD, his social skills were also severely delayed. He rarely made eye contact with others in his environment and preferred to follow his own agenda. When adults attempted to interact with Michael he either ignored them or became agitated.

The first objective was to assist Michael in establishing intentionality. Michael demonstrated means-to-end relationships with objects, but he did not use language directed toward a person for the same goal. For example, Michael could readily pull a string to obtain a desired object or climb on a stool to obtain a preferred toy out of reach. However, unlike typical children, he did not direct gestures or words toward adults to achieve either instrumental (I want) or social (look at me) goals. Michael did use words to label objects, albeit uncommunicatively. We wanted to build on his existing capabilities. Since Michael labeled objects, we wanted to shape his labeling behavior by responding as if it was intentional. By doing this we tried to facilitate Michael's use of words to achieve a desired object (e.g., instrumental verbal intentions). Our first step was to provide Michael with pictures to label. We chose Mayer-Johnson pictographs (1994) because Michael responded well to black and white line drawings. Furthermore, the pictographs were generic, not representing any real object in Michael's environment. When Michael labeled a picture we would give him a similar object responding with "you wanted the . . . ." For example, when Michael labeled the Mayer-Johnson picture of a truck we responded with "Michael wants truck" and gave him a favored toy truck.<sup>1</sup> It took approximately two weeks for Michael to understand that his words had an effect on persons in his environment. Once Michael understood he could have an effect on persons in the environment we began to engage him in social routines. In five weeks, Michael spontaneously requested a toy within the context of a routine without first being prompted by a picture. By the seventh week, he requested a toy outside of the routine.

The second objective was to assist Michael in establishing meaningful/functional social routines. At around 8–12 months of age, typically developing children engage in linguistically meaningless social routines (e.g., peek-a-boo). These performatives have specific speech uses such as "one two three \_\_\_\_\_," and children recognize them as belonging to the routine. Over time, children verbally participate in the routine by spontaneously supplying the frame-appropriate speech. Even if this speech is meaningless (e.g., peek-a-boo), it facilitates intersubjectivity between children and their communicative partner (Ninio & Snow, 1996). We began to engage him in linguistically meaningful social routines. For example, "one-two-three" was replaced with "where's Michael" and "peek-a-boo" was replaced with "here I am." Further, these routines centered around a core set of functional words. We identified Michael's functional core vocabulary by taking inventories of his environment. We took a home and school inventory by interviewing his caregivers and teachers to determine which communicative functions they felt would most benefit Michael. We developed a list of words which could be depicted

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<sup>1</sup>This portion of the remedial procedures is similar to Picture Exchange.

in a routine context. Michael's functional core vocabulary consisted of the following words and phrases: wait, clean up, my turn, more, open, close, up, down, go (and when requested by Mom, names of colors).

At first, routines were embedded within a very specific context. For example, the "wait, wait, wait" routine was introduced within the context of a toy truck where a little man ran after the truck saying "wait, wait, wait." It took five weeks for Michael to increase his social participation in the routine. Initially he would smile and imitate us. By week seven he spontaneously verbalized "wait wait wait" at the appropriate time in the routine. As with the peek-a-boo routines found in typical children, "wait wait wait" became a performative or context embedded social act for Michael. He showed us, through both his verbal and nonverbal behavior, that he was becoming more social with his communicative partner.

To give the context embedded speech a more functional dimension, we began to use "wait wait wait" in a variety of contexts to scaffold the functional use of the word "wait." First, we varied the material used and then began to apply the "wait wait wait" routine in other environments that required Michael to wait. The only constant left in the routine was the words. Thus, the words "wait wait wait" triggered his waiting routine. For example, when Michael would run in front of us we could tell him to "wait wait wait" and he would stop and wait for us to join him.

As with the "wait wait wait" routine we decontextualized each of the other routines for Michael. First we changed the materials used, and then the environment. In this way, we facilitated Michael's social and linguistic skills.

The fourth objective was to assist Michael in establishing joint attention. In this therapeutic intervention we brought Michael through the earliest two steps leading toward joint attention. Michael never did reach true joint attention. Many children with autism may never reach this step. However, this therapy facilitated Michael's receptive and expressive speech within a specific language context as well as his social functioning within his environment. What we were able to accomplish in the therapy was to strategically shape a verbal routine, thereby scaffolding Michael's behavioral response to the expectations of his environment.

## CONCLUSIONS

Virtually all children with autism exhibit a serious impairment with each component of the ontogeny of joint attention. Many, like Michael, may never reach true joint attention. Nonetheless, it is important for speech-language pathologists to have intervention strategies that facilitate functional communication. Rather than attempting to engage Michael in joint attention activities, we began our intervention at an earlier step in the developmental trajectory of joint attention. Our goal for Michael was that he would understand words as a

means to an end. Here we started building on his existing capabilities of labeling. Once he used words for instrumental purposes we engaged him in social routines. Unlike the early social routines of typically developing children, Michael's routines were linguistically meaningful. Most importantly, Michael's routines were designed to target communicative functions that his parents and teachers saw as important functional goals. At first the intervention took place in a very specific context. Once Michael was able to engage in frame-appropriate speech and increase his social awareness with the clinician, we expanded the task domain by varying the materials and the environment. Although we were following a sequence laid out by typical children, in which the re-occurrence of situation language facilitates language acquisition (Bruner, 1983; Ninio & Bruner, 1978; Snow & Goldfield, 1983), we did not observe spontaneous generalization of word meaning through the repetition of routines alone. Rather, we needed to systematically vary the materials and the environment to scaffold his increased linguistic understanding of the words within each of the routines. During the 15-week therapy program, Michael did not engage in true joint focus of attention. Nonetheless, his parents and teachers acknowledged that he was more social and his communication skills more functional. For Michael, as for many children with autism, increasing functional language skills is an important intervention goal. Joint attentional routines, as described here, are a promising means to achieving functional language skills in children with autism.

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## **CONTINUING EDUCATION: SUGGESTED READING WITH QUESTIONS**

### **An Intervention Technique for Children with Autistic Spectrum Disorder: Joint Attentional Routines**

#### SUGGESTED READING

- Ninio, A., & Snow, C. (1996). *Pragmatic development: Essays in developmental science*. Boulder, CO: Westview Press.
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#### QUESTIONS

1. The first step in the developmental sequence of joint attention is:
  - a. Participate in the instrumental use of language
  - b. Participate in social routines
  - c. Understand that other people have intentions
  - d. Establish and maintain shared attention with others
2. The disassociation between social communicative and regulatory intentions in children with autism suggests:
  - a. The developmental trajectory of joint attention is similar to that of regulatory intentions
  - b. The developmental trajectory of joint attention is independent to that of regulatory intentions
  - c. Pragmatic skills in children with autism follows a different developmental sequence than typical children
  - d. b and c
3. Research has found that joint attention facilitates:
  - a. Vocabulary development

- b. Grammatical development
  - c. Instrumental use of language
  - d. All of the above
  - e. a and b
4. Speech-language pathologists should understand the developmental course of joint attention because:
- a. Joint attention is developmentally linked with instrumental language
  - b. Joint attention facilitates functional use of language
  - c. To intervene at the earliest step possible
  - d. b and c