Teaching Young Children with Autism To Talk

Paul Yoder, Ph.D.,[1] and Andrea McDuffie, Ph.D.[2]

ABSTRACT

Frequent functional spoken communication is a common goal for young children with autism. We propose that the number of different nonimitative, referential, conventional, and communicative words used in a language sample is a reasonable measure of the behavior we wish to increase in such children. We review our own and others' studies focusing on young (i.e., 2 to 3 years old) children with autism to provide a rationale for including object play and nonverbal communication as potentially important treatment goals. Children who are not yet fluent in object play and nonverbal communication may need to improve these skills to facilitate the implementation and uptake of direct language therapy. Past research has shown that object play, nonverbal communication, and useful speech all are influenced by various types of interventions in young children with autism.

KEYWORDS: Object play, nonverbal communication, spoken communication, intervention, autism

Learning Outcomes: As a result of this activity, the reader will be able to (1) articulate the rationale for including object play and nonverbal communication as companion or precursor goals to teaching children with autism to talk, (2) develop intervention plans that facilitate play behavior, and (3) implement interventions that facilitate intentional communication in children with autism.

Several retrospective reports identify functional language use before the age of 5 as a consistently strong predictor of later social and adaptive functioning for individuals with autism spectrum disorders (ASD).[1–5] By functional language use, we mean the expressive ability to use conventional linguistic means to convey information and intentionally influence the behaviors of others.[6] The construct of functional expressive language is also termed "useful

[1]Professor, Department of Special Education, Vanderbilt University, Nashville, Tennessee; [2]Post-Doctoral Fellow, Waisman Center, University of Wisconsin, Madison, Wisconsin.

Address for correspondence and reprint requests: Paul Yoder, Ph.D., Department of Special Education, Peabody Box 328, Vanderbilt University, Nashville, TN 37203. E-mail: paul.yoder@vanderbilt.edu.

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speech" and has come to mean referential spoken word use that is flexible, frequent, communicative, and nonimitative.[1,3,7]

For speech to be flexible, it must be used in more than one context. For speech to be communicative, it must be used for the purpose of conveying a message to a social partner. Spoken words must be pronounced in a sufficiently accurate manner to be intelligible to others. Spoken words must also be linked to specific referents, whether these referents are objects, actions, or ideas. Using the same word repeatedly, or speaking only with delayed or immediate echoing of others, is not as useful as the ability to use many different nonimitative words in the appropriate contexts. Therefore, we posit that the number of different nonimitative words used communicatively by a child is a particularly helpful metric of useful speech in children with ASD. It reflects both talkativeness and productive vocabulary size.[8]

THE USEFUL SPEECH DEFICIT IN CHILDREN WITH AUTISM

Most children acquire language from incidental exchanges with a variety of people in a variety of contexts talking about a variety of topics. Unfortunately, an estimated 50% of children with autism do not learn to speak as their primary mode of communication even with treatment.[9] It is possible that such estimates need updating because new treatment methods were developed in the 1990s.[10] Regardless of the exact number of children with autism who achieve useful speech by 5 years of age, many potential explanations exist for why children with autism benefit less from the types of interactions that support language learning in typically developing babies and toddlers. Many of these explanations are based on the core deficit in joint attention skill development that characterizes young children with ASD[11] and emphasize the particular importance of two types of joint attention behaviors: that is, responding to joint attention (RJA)[12] and initiating joint attention (IJA).[12,13] As is the case for all joint attention behaviors, RJA and IJA require children to coordinate attention between social partners and objects in the language learning environment.[14]

According to social pragmatic theories of language development, when the child understands that a partner's focus of attention is different from her own, she can act intentionally to establish a shared focus of attention by using RJA to modify her own attentional focus or by using IJA to modify the attentional focus of the conversational partner. Achieving a shared focus on objects or events creates the potential for reciprocal interaction and increases the probability that the child will receive and attend to accurate pairings between labels and referents.

Transactional theories of language learning also emphasize the importance of reciprocal interaction with conversational partners and suggest that the child's use of RJA and IJA are important because of the way such behaviors influence conversational partners.[15] IJA may be important for language learning because it elicits adult verbal labels for the object that is the focus of shared attention.[16] In fact, Yoder and Warren[17] demonstrated that such maternal responsivity mediated the relationship between nonverbal intentional communication and later language. RJA may be important for language learning because, once the child has followed into the adult focus of attention, the adult often labels the shared referent object. Additionally, such joint attention skills may have cumulative effects on the frequency and quality of others' interactions with the children. For example, when children share their interest with us, we may view them as more enjoyable to interact with than if the children only use us as tools to achieve their own instrumental goals.

Without explicit treatment, deficits in coordinating attention between people and objects make it less likely that children with autism will acquire sufficient linguistic input from incidental exchanges with conversational partners to support adequate language acquisition.[18] Yet it is clear that clinicians cannot teach children with autism every word they need to know. Doing so would be too inefficient to meet the child's growing physical and social needs. An alternative to explicitly teaching each word is to address child behaviors that elicit the kinds of incidental input from which children with autism benefit. To do this we need to know, first, the types of interactions

that facilitate children's lexical acquisition and frequent use of spoken communication, and second, which child behaviors elicit such interactions. Unfortunately, we do not have definitive answers to either question. However, we do have some hypothesized answers to these questions.

INCIDENTAL INTERACTIONS THAT MAY FACILITATE USEFUL SPEECH IN CHILDREN WITH AUTISM

There is only one study in the literature that even suggests the types of incidental interactions that help children with autism to acquire language. By conducting a longitudinal correlational study of 25 preschoolers with autism, Siller and Sigman[19] demonstrated that parents who used synchronous and undemanding talking about their child's focus of attention were likely to have children with relatively high language in their mid and late teens. The authors' measure of synchronous, undemanding talking indicated the degree to which the parent's verbal utterances referred to objects that were already the focus of the child's attention without suggesting that the child produce a different action with the object.

One theory of why adult talking that is both synchronous and undemanding may facilitate child language acquisition is that such adult talking provides linguistic information at a time and in a way that does not tax the child's limited processing capacity.[20] It is thought that asking a child to disengage and shift from his current focus of attention or follow adult directives is more difficult than letting a child attend to and do what he chooses.[19] When an adult puts into words a child's probable thoughts as revealed by the child's actions, this type of "follow-in" linguistic labeling provides temporal and semantic contiguity between the adult's words and the child's focus of attention. This correspondence may aid the child in accurately associating novel labels with their referent objects.[21–23] For example, when a child is manipulating the hinged cover of a brightly colored box, the adult might provide synchronous and undemanding talking by saying, "Oh, you are trying to open the box!" Over time, the child will hear the same label paired with additional exemplars in different contexts (e.g., "You found a box of cookies!" or "You put your shoe in the box!"). This continued experience will provide the basis for decontextualizing the meanings of newly acquired words and should also support the ability to use words flexibly, apart from the structured contexts or routines in which the words were initially learned.

Many studies have demonstrated that follow-in adult input supports vocabulary acquisition compared with a situation in which the adult and child have a discrepant focus of attention[24,25] (e.g., the adult is labeling an airplane while the child is looking at a dog) or a situation in which the parent actively attempts to modify the child's focus of attention (e.g., the child is engaged with a balloon and the adult wants the child to look at a book).[26,27] The construct of "supported joint engagement"[28] has been used to describe the type of interaction in which the parent follows-into and scaffolds the child's ability to maintain her focus of attention. For example, when supporting joint engagement, the adult might move or shake an object so the child maintains her attention to it and can observe what the object does when activated. In such an interaction, the child and adult are clearly focused on the same event. The child is not required to explicitly acknowledge or direct communicative acts to the parent, yet the parent's behavior changes the way in which the child experiences the object. The construct of supported joint engagement suggests a pathway to language acquisition that does not require the child to actively coordinate attention between objects and people and provides a mechanism by which children with autism can acquire useful speech without explicit awareness that their own focus of attention is shared with an adult.

Because Siller and Sigman's[19] is the first study of its kind in the autism literature to specify the kind of parent behavior that can influence later language, replication is critical before we use this information clinically. If future studies show replication of the value of synchronous and undemanding adult talk then, logically, one context that may be important to setting up the opportunity for adults to support joint engagement and provide such talk is object play. In other words, parents will find

it easier to use undemanding and synchronous talk when their children are actively engaged with objects to talk about.

Linguistic mapping is another strong candidate for the type of adult behavior that we would like to stimulate. The theory for why linguistic mapping may affect children's language development is very similar to that provided for undemanding synchronous talking. However, linguistic mapping differs in that it linguistically encodes the communicative message that the child has directed at the adult. In linguistic mapping, the child's message may communicate his intention to share interest in an action or event, such as pointing to a dog, to which the adult responds, "You think that doggy is funny!" Alternatively, the child may communicate a request, such as reaching for a goldfish cracker and looking to the parent's face, to which the adult responds, "You want a cracker, don't you?" In contrast to linguistic mapping, synchronous and undemanding talking describes the child's actions. In synchronous and undemanding talking, when the child puts a toy clown into a wagon, the adult might say, "You put the clown in the wagon!" Inasmuch as communicative messages are a more reliable source of information about the child's immediate thoughts, linguistic mapping could prove more effective than undemanding synchronous talk in facilitating spoken communication and lexical development.

CHILD BEHAVIORS THAT MAY ENABLE THE USE OF UNDEMANDING SYNCHRONOUS TALK AND LINGUISTIC MAPPING

If we seek to enhance use of synchronous undemanding talk and linguistic mapping by adults, our first job may be to identify child behaviors that we might modify that could have a transactional effect on parental input. We first discuss the child behaviors that set the stage for adult synchronous undemanding talk.

Three areas of object play are worth considering as potential child behaviors that may provide opportunities for adult use of synchronous talking: (1) sustained, productive object engagement, (2) play with a variety of objects, and (3) diversity of object play. By sustained, productive object engagement, we mean that the child purposefully moves objects in a way that enables adults to identify verbally, at that moment, what objects interest the child and what about the objects interests her (e.g., the child is dropping blocks into a bowl; the child is shaking a rainstick and listening to the sound it makes; the child is rolling cars down a ramp). If the child only plays with a limited set of objects, then the adult synchronous and undemanding talk will be able to provide only a limited number of object labels. Additionally, if the child only plays in a few different ways, then adult synchronous and undemanding talk will include only a limited number of action verbs, descriptive words, or other relational terms. When children play for several minutes with an object or related set of objects in varied ways, the adult can model many different words about the child's actions and referents of interest. When the child plays in this way with many different object types, the number of referents and actions the adult can talk about are much greater than if the child only shows interest in one type of object.

One difference between linguistic mapping and undemanding synchronous talk is that the opportunity to provide linguistic mapping depends on the child to initiate an interaction by intentionally communicating with the adult. Logically, children who communicate their intentions frequently provide more opportunities for linguistic mapping. Although mothers and other adults attribute communicative status to a host of preintentional nonverbal behaviors,[29] mothers of toddlers with developmental delays tend to respond more consistently to intentional communication than to preintentional communication.[30] Presumably, this occurs because intentional communication typically identifies both the referent and the message recipient and preintentional communication usually identifies only the referent *or* the message recipient. In toddlers with mental retardation, we know that using a treatment to increase intentional communication indirectly elicited more linguistic mapping utterances from adults, which in turn facilitated later language development.[31–33] We do not have similar information in children with autism. However, we do know that treatments that use much

linguistic mapping (e.g., Pivotal Response Training, PRT) have been shown to facilitate spoken communication.[34]

If linguistic mapping facilitates spoken communication and lexical development, then increasing the frequency that children with autism intentionally communicate may be a reasonable child goal. Increasing intentional communication would increase the opportunity for linguistic mapping. What types of intentional communication might be likely targets? We know that frequency of both requesting and commenting (two types of nonverbal, intentional communication) predict later vocabulary size.[35–38] Perhaps one reason for this finding is that both types of intentional communication provide the opportunity for adult linguistic mapping of child communication, which in turn results in spoken communication development. Although there is more current interest in commenting as a predictor of later language,[13,39] no published study has shown that commenting is a significantly stronger predictor of later language than requesting in children with autism. Therefore, there is good reason to consider both of these major pragmatic functions as important intervention targets.

Fortunately, object play and intentional communication are known to be enhanced by intervention efforts. However, before examining studies that have attempted to address object play and intentional communication as treatment goals, it is helpful to review the criteria important for considering such studies to be of high quality.

CRITERIA FOR HIGH-QUALITY TREATMENT STUDIES

Well-designed treatment studies have certain characteristics that control for nontreatment explanations for changes in the dependent variable.[15,40] In other words, the study must use some mechanism to ensure that any changes in the dependent variable (i.e., play or intentional communication) are caused by the treatment and not other factors. Additionally, we must determine whether changes caused by treatments can be generalized. By generalization, we mean that the person, location, activities, and interaction style of the context in which we measure play or intentional communication before and after treatment are different from those used during treatment. Controls in group designs used to eliminate nontreatment explanations for growth in play and intentional communication include, but not are limited to, comparison groups of children who receive an alternate treatment or serve as a nontreatment control group and random assignment to the intervention and comparison groups.[15] In single-subject designs that are most commonly used in treatments to increase play and intentional communication (i.e., multiple baseline across participants), inferences are made as to whether a particular intervention is effective by comparing play or intentional communication in baseline (no treatment) versus treatment conditions within the same subject over time. Changes from the baseline to intervention condition should be evident through visual inspection of the data. Controls over other explanations for the changes in play and intentional communication in the multiple baseline design include no or little change in play or communication during baseline; little overlapping data between baseline and treatment phases; almost immediate shifts in the level, trend, or variability of the dependent variable with the onset of the treatment; and replication.[41]

Here, we briefly define the principles that are important for inferring that a particular treatment, not other treatments the child experiences, affects play or intentional communication in a multiple baseline across participants design. First, no change in play or intentional communication should occur until after the treatment phase begins in any of the participants. Second, few overlapping data points between baseline and treatment phase should occur. Few overlapping data points reflect that the data values obtained during baseline are dissimilar to values obtained during the intervention. Extreme variations in performance during either phase as well as a delay in change in the dependent variable long after the onset of the treatment both result in much overlapping data between phases. Third, in multiple baseline designs, the more quickly changes in level, trend, or variability occur after the end of the

baseline, the more obvious the effect of the particular intervention being tested. As the time between the onset of the intervention and the change in behavior increases, the more likely it is that explanations other than the particular intervention being tested account for the observed change. Change in level refers to a discontinuity in performance from the end of baseline to the beginning of the intervention phase. A trend is a straight line drawn through the middle of the data points such that the average difference between the data points and line is minimized. A change in trend refers to the degree to which the line is tilted up or down. When a trend changes many sessions after a treatment begins, it is best to draw two lines: one for the data prior to the beginning of the change and one for the data after the change. Variability is the average difference between data points and the trend line. Finally, replication in single-subject designs examines the generalizability of the findings across subjects, behaviors, or settings.[41] Replication occurs when findings that meet the above criteria are observed in at least two participants. The greater the proportion of participants in whom we see a treatment effect, the stronger the evidence supporting a conclusion that the treatment works for a variety of children.

In the following section, we review three well-designed intervention studies that target the acquisition of play skills in preschool-aged children with autism. These particular studies were selected because they met the criteria we consider to be important for determining the quality of a treatment study. One study used a group design with random assignment to either the experimental or comparison groups, while the other two studies employed multiple baseline across subjects designs.

SELECTED HIGH-QUALITY PLAY TREATMENT STUDIES WITH CHILDREN WITH AUTISM

The first study used a group design to target the acquisition of symbolic play skills in 3- and 4-year-olds with a clinical diagnosis of autism.[42] In this study, 65 children were randomly assigned to one of three conditions targeting either symbolic play skills, joint attention skills, or a nontreatment comparison condition. Pre- and post-testing included a structured play assessment conducted by examiners blind to the children's treatment status and a 15-minute mother-child unstructured play sample. The mother-child play sample served as the generalization condition assessing outcomes with an individual who was not the child's interventionist. Outcome measures included the number of novel child-initiated functional and symbolic play-acts with toys. The highest level of play at which the child demonstrated at least three different types of spontaneous play acts was also measured. During treatment sessions, each child received 5 to 8 minutes of discrete trial training at a table, followed by a more naturalistic, child-directed period of play conducted on the floor and designed to support generalization of learned responses. Some of the techniques used during the naturalistic portion of the intervention session included following the child's lead, talking about what the child was doing, imitation of the child's utterances and actions with the toys, expansion of the child's utterances, and manipulating the environment to engage the child. Significant improvement in play skills was observed for the children assigned to the play intervention, but not for the children assigned to the joint attention or nontreatment comparison conditions. After treatment, children in the play intervention group had higher levels of play during the structured play assessment. They also generalized intervention gains to the mother-child interaction session in which they demonstrated more diversity in types of play acts as well as higher levels of play.

The second well-designed study used a single-subject sequential treatments design to examine whether three 4-year-old children with autism would differentially learn and generalize play behaviors that were appropriate for their developmental level of play compared with play behaviors that were age appropriate but in advance of their developmental level.[43] Developmentally appropriate play behaviors were defined as those that had not yet appeared in the child's play repertoire, but for which all developmental play prerequisites were present, as measured by the Developmental Play Assessment (DPA).[44] Specifically, the children were

taught exemplars from the Child as Agent play category (developmentally appropriate) and exemplars from the Doll as Agent play category (age appropriate). In the Child as Agent category, the child performs a familiar action on a doll figure (e.g., the child extends a spoon to the doll's mouth or covers a bear to put it to sleep). In the Doll as Agent category, the child moves the doll figure as if it were capable of action (e.g., the child gives the spoon to the doll so it can feed itself or makes the bear walk to the bed).

During treatment sessions, participants were physically guided through the target play behavior and prompted to produce the target behavior. Four types of child responses were recorded during treatment and generalization sessions: physically guided actions; prompted actions; spontaneous production of targeted actions with figure on which the action was originally taught (i.e., using the brush on the doll's hair); and production of nontargeted actions on either a target or nontarget figure (e.g., wiping the bear's face with a cloth).

Results demonstrated that two of three children more rapidly acquired play behaviors from the developmentally appropriate Child as Agent category, while all of the children generalized the Child as Agent play skills to other activities and toys. Despite a greater number of teaching trials for the Doll as Agent play skills, only one of three children acquired this category of play behavior and none of the children showed generalized use of this developmentally advanced category. The results of this study have important clinical implications for assessment and intervention in that carefully assessing the child's current play level and targeting play behaviors that are developmentally appropriate based on this level of play will result in faster acquisition and greater spontaneous and generalized use than targeting behaviors in a play category that is too advanced.

The final internally valid study used PRT to teach symbolic play behaviors to seven children with autism who were between 4 and 8 years old.[45] This study used a multiple baseline design across participants and assessed generalization across settings, toys, and play partners. There was also a comparison condition in which each of the participants received PRT targeting language rather than play goals. Symbolic play behaviors included using one object as if it were another (e.g., using a cylindrical block as a spoon or a row of chairs as a bus), attributing properties to an object (e.g., acting as if a play stove is "hot" or a doll's face is dirty), and referring to absent objects (e.g., acting as if a bowl is full of soup or there is money in one's pocket). These types of symbolic play behaviors may be contrasted with functional play actions in which an action is produced with an object or toy replica in accordance with the object's conventional use (e.g., a toy bottle is used to feed a baby doll or a cloth is used to wipe the doll's face). Play was considered to be complex if the child performed a sequence of at least three actions related to the same play theme. Results were reported as the proportion of 30-second intervals during which the child engaged in symbolic play. All five of the participants increased their amount of symbolic play from baseline to a post-testing condition with their interventionist while using the same toys that had been used during treatment. Three of the five children showed increased play during post-treatment sessions using different toys or with peers, and two of the five showed increased play during post-treatment sessions with a parent. Play skills did not improve following PRT targeting language goals.

In summary, results from these three internally valid intervention studies suggest that play skills can be targeted successfully for children with autism. The acquisition and generalized use of play behaviors may require explicit targeting with intervention specifically designed to address play. Finally, the acquisition of play behaviors by children with autism will be more efficient if the behaviors selected as intervention targets are situated at, but not in advance of, the leading edge of the child's developmental level.

SELECTED HIGH-QUALITY COMMUNICATION TREATMENT STUDIES WITH CHILDREN WITH AUTISM

Nonverbal intentional communication is the use of gestures, gaze, and nonword vocalizations that use coordinated attention to an object

and a person to communicate.[16] Showing attention to adults may be particularly difficult for children with autism. In adults with autism, a recent study using eye tracking along with functional magnetic resonance images of the brain demonstrated that activation in the fusiform gyrus and amygdale were strongly and positively correlated with the amount of time spent fixating on the eyes of pictured faces during an experimental task of face processing.[46] This study suggests that characteristic patterns of gaze aversion observed for individuals with autism may serve an adaptive purpose by reducing overarousal in the brain's emotional circuitry during processing of facial stimuli. This aversion to eye gaze in children with autism may be one obstacle to displaying obvious intentional communication through conventional means. Additionally, some children with autism may show restrictions in object play with regard to the variety of actions they use[47] and number of objects to which they attend.[48] Logically, this restricts the number of objects or events they are likely to be motivated to communicate about.

A variety of treatments have been shown to be effective in facilitating intentional communication in children with autism (see Goldstein[49] for a review). We have recently completed a study[50] comparing two particular treatments, Responsive Education and Prelinguistic Milieu Teaching (RPMT) and the Picture Exchange Communication System (PECS). This study demonstrated that the more optimal treatment for a child depends not only upon initial rate of communication with gaze to face, but also upon object play skills. These two treatments are also salient because of their differences in targeting look to face as a means of showing attention to the adult and in targeting object play.

For example, PECS provides a way to show intentional communication without showing eye gaze between the child and another person.[51] The child is taught to give a picture of a desired object to another person. The selection of the picture shows attention to the referent while delivering the picture shows attention to the adult. RPMT is another promising method of teaching intentional communication to children with autism.[52] Unlike PECS, RPMT directly targets eye gaze. Targeting eye gaze directly could be problematic for children who are extremely aversive to eye gaze. Therefore, children with low eye gaze may be better served by PECS than RPMT.

Additionally, both treatments reward communication with access to, or continuation of, play with objects. If children are not interested in a variety of objects prior to treatment, it will be more difficult to find potential reinforcers for the children's communication than if they begin treatment with many interests. One important difference between PECS and RPMT is that RPMT, but not PECS, teaches children how to play with objects if they do not begin treatment with these skills. Therefore, the relative efficacy of PECS versus RPMT in facilitating intentional communication may vary by each child's pretreatment interest in objects, when random assignment to treatment group is made. Children with low initial interest in objects may benefit more from RPMT than from PECS because the former teaches the skill that both treatments require.

Yoder and Stone[52] conducted a comparison of the efficacy of PECS and RPMT to facilitate intentional communication in children with autism. To measure initial interest in objects, this randomized group experiment of 36 children with autism (mean chronological age = 34 months, SD = 8 months) measured the number of different toys that children touched during the DPA[53] prior to treatment. Initial tendency to use look to face when communicating was measured during a semi-structured free play session with the examiner. During the treatment phase, parents in both groups received an average of 9 hours of parent support and training. Children received an average of 60 (SD = 7.1, range = 33 to 70) treatment sessions spread over a 6-month period.

Two communication sampling procedures served as the measurement context for intentional communication and useful speech at pretreatment, post-treatment, and 6-month follow up. One was an unstructured communication sample consisting of a 15-minute semi-structured sample of free play with no use of environmental arrangement or communication

prompts. The other was a structured communication sample, the Early Social Communication Scales (Mundy P, Hogan A, Doehring P, written communication, 1996).

Children in both treatment groups grew in their ability to communicate intentionally. Children who used under 2.4 communication acts with gaze to face per minute prior to treatment demonstrated more of an increase in initiating joint attention immediately after treatment if they were in PECS rather than in RPMT. In contrast, children who used more than 6.9 communication acts with gaze to face per minute prior to treatment demonstrated more of an increase in initiating joint attention immediately after treatment if they were in RPMT rather than in PECS (R square change = 0.38; $t(32) = 4.6$; $p < 0.001$) (Yoder P, and Stone W, unpublished data, 2005).

Treatment effects were also detected in the combined number of intentional communication acts children used 6 months after the end of treatment, but only in children who were initially low in object interest (i.e., touched fewer than 7 different toys in 15 minutes during the DPA). Such children used more intentional communication acts if they were assigned to the RPMT group than to the PECS groups (R square change = 0.20; $t(32) = 2.83$; $p = 0.008$).[51] The take-home point is that both treatments appear to be effective in facilitating generalized intentional communication but the superior treatment varied by initial skills of the children. These initial skills were tendency to look to face in communication and one measure of play (i.e., variety of toys explored).

The same study of children with autism also examined the relative effect of PECS and RPMT on growth of useful speech.[54] The effect on growth in the number of different nonimitative words used in communication samples was faster in children assigned to the RPMT than to PECS if they began treatment with initially low levels of object exploration. In contrast, the effect on growth in the number of different nonimitative words used in communication samples was faster in children assigned to PECS than to RPMT if they began treatment with initially high object exploration.

The pattern of results was strikingly similar for the intentional communication and useful speech outcomes. That is, children with initially low object exploration benefited more from RPMT than PECS 6 months after the end of the treatment phase. This result emphasizes the interconnectedness of object play, intentional communication, and spoken communication in children with autism. In fact, above and beyond treatment effects, pretreatment diversity of object play and frequency of intentional communication were each predictors of variability in growth of number of different words used.[54] These individual predictive associations remained after controlling for expressive language impairment and the number of different words used prior to the intervention.

INTER-RELATEDNESS OF OBJECT PLAY, INTENTIONAL COMMUNICATION, AND USEFUL SPEECH IN CHILDREN WITH AUTISM

By now, the reader can clearly see that we believe there is interdependence between object play, intentional communication, and educational treatment efficacy. The explanations we have given for this interdependence imply a causal relationship. However, the extent to which we have evidence for this causal relationship in children with autism varies depending on the relationship to which we are referring. There is a clear causal relationship between certain educational treatments and all three areas of child development (play, communication, and language). There is not yet evidence that targeting object play or intentional communication will facilitate spoken communication in children with autism. And there is not evidence that focusing on play or intentional communication prior to language intervention increases the efficiency of language intervention in children with autism.

One reason for considering object play and intentional communication as companion goals to spoken communication is to provide the child with potential cognitive underpinnings of language development. Object play may predict meaningful language in children with autism because children with many action schemas demonstrate greater object knowledge, thereby providing a greater number of nonverbal

concepts onto which children potentially can map language. Intentional communication often involves coordinated attention to object and person. Coordinated attention may also be an early indicator of "understanding others' intentions," a theoretically important precursor to linguistic communication.[55] Bruner[56] suggested that nonverbal intentional communication provides the basis for later linguistic communication in that children only need to learn the words for meanings they are already communicating.

Perhaps equally important to these older, more commonly cited reasons for considering object play and intentional communication relevant to teaching children to talk is the notion that many available language treatments for children with autism are easier to implement, and thus more effective, if children begin such treatments with relatively good object play and intentional communication skills. Consider naturalistic language interventions such as PRT[33] and Enhanced Milieu Teaching.[57] Both use access to and continued play with objects as rewards for communication. Both use object-centered play routines and violation of such routines to motivate communication. That is, these types of treatments teach words at times the child has the intention to communicate. Such a strategy is particularly important for children with autism, many of whom do not use the words they understand to communicate. In children with little interest in objects, such object-centered routines are difficult to develop. Without such routines, it is more difficult to situate prompts to communicate within contexts that are likely to elicit the child's genuine need to communicate. Delivering prompts to use a word when the child does not feel the need to communicate may not help children with ASD learn to use words to communicate. A similar argument can be made around intentional communication. One can reasonably argue that the most effective prompts to communicate are those that occur immediately after the child's intentional communication and are attempts to teach the child more advanced ways to communicate the child's previous message. For children who intentionally communicate infrequently, such optimal teaching moments are rare.

In summary, we propose the notion that teaching children useful speech (i.e., frequent, nonimitative, communicative spoken language) involves not just the teaching of words, but also relies on above-threshold levels of object play and intentional communication. It should be noted that we are not recommending that all language therapy for children with autism be indirect. Instead, we are suggesting that direct and explicit language therapy will probably be more easily implemented and more effective if children use frequent intentional communication and varied object play. If the latter skills are not in place, then nonverbal communication and play goals need to be targeted prior to or simultaneously with targeting language goals. If the language intervention method used does not teach intentional communication or object play, then such skills should probably be taught within another component of the child's treatment plan.

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