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The Effect of Social Context on the Functional Communication Skills of Autistic Children[1]

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This study investigated autistic children's use of attention-directing gestures and language in three different interactive situations which varied in social context factors. These behaviors were videotaped and compared in autistic children (n = 15), children with developmental language delay (n = 14), matched on mental age and mean length of utterance (MLU), and MLU-matched young normal children (n = 13). Results supported the hypothesis that autistic children's attention-directing behavior would differ most from that of the other groups in spontaneous interactions. However, contrary to expectation, the autistic children did not produce more attention-directing behavior when a high degree of adult direction was provided. Overall, the autistic group used attention-directing behaviors less frequently than the other groups, and in the autistic group these behavors varied less across social context factors. Results are interpreted in terms of their implications for language intervention programs with autistic children.

Autistic children have severe deficits in the development of functional communication skills (Cantwell, Baker, & Rutter, 1978; Fay & Schuler, 1980; Olley, 1985). In particular, they have difficulty using language in relation to the context of discourse. An autistic child may be able to articulate words

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and construct grammatically correct sentences, but have trouble using these skills appropriately in a variety of social situations.

The recent emphasis on examining the pragmatic aspects of autistic children's language has stimulated interest in determining the effect of specific social context variables on their communication behavior (Olley, 1985). Although there are numerous clinical descriptions of the effects of particular social environments on autistic children's communication (Baltaxe, 1977; Bernard-Opitz, 1982; Fay & Schuler, 1980; Mundy, Sigman, Ungerer, & Sherman, 1986; Sigman, Mundy, Sherman, & Ungerer, 1986), few studies have specifically investigated the effect of social factors.

One aspect of the social context that has been investigated in relation to autistic children's use of language is the amount of direction provided by others. There is disagreement regarding the type of social approach (i.e., high degree of structure versus low interpersonal demands) that facilitates autistic children's successful interaction in communicative exchanges (Clark & Rutter, 1981). Richer (1976, 1978) argued that autistic children withdraw from structured social contact initiated by others and respond more appropriately in interactions in which adults merely respond to the child's initiations. In contrast, other researchers described autistic children as showing the most optimal performance in highly structured situations (Bartak & Rutter, 1974; Schopler, Brehm, Kinsbourne, & Reichler, 1971).

In an attempt to address this controversy, Clark and Rutter (1981) exposed a group of autistic children to four different styles of approach by an adult. The styles varied in the amount of task structure and interpersonal demands made on the children. The autistic children showed significantly more social responsiveness (i.e., relevant speech and adult-related behaviors) with high interpersonal demands. Positive effects of increased structure on autistic children's use of gesture have also been reported. Bartak, Rutter, and Cox (1975) found that although the majority of children in their autistic group produced complex gestures on demand, significantly fewer used these gestures spontaneously.

Other social context factors which have been investigated in relation to autistic children's communication include the effect of people in the child's environment and their type of response to the child's attempt to communicate. Autistic children used more communicative gestures (e.g., showing) when teachers were present and taking a directive role than when they played together without a teacher present (McHale, Simeonsson, Marcus, & Olley, 1980). Modification of teachers' interactive behaviors (e.g., more repetitions, touching the child) were effective in enhancing autistic children's ability to orient (Lord, Merrin, Vest, & Kelly, 1983) and respond to social interactions (Dawson & Adams, 1984). Also, autistic children's ability to continue a conversation after asking a question varied with the type of response provided

by the experimenter. Continuations doubled in frequency when the experimenter responded by asking the child a question or reversed the child's question by saying "Tell me" rather than simply providing the requested information to the child (Hurtig, Ensrud, & Tomblin, 1982).

These studies suggest that autistic children's ability to participate in social interactions is related in part to the social context factors, and that when another person provides specific information about what is expected, autistic children are more attentive to the interaction and show a greater degree of responsiveness (i.e., relevant speech and gestures). However, studies investigating the effect of specific social factors on autistic children's communication skills have only included autistic children and have used broad rather than specific measures of communicative functioning. It remains unclear whether aspects of social context affect autistic children differently from nonautistic children. In addition, the effect of different social contexts on the use of specific forms of language and gesture had not been determined.

In earlier studies (Landry & Loveland, 1988; Loveland & Landry, 1986), we found that autistic children had particular difficulty using and understanding attention-directing gestures such as pointing and showing and attention-directing words such as personal pronouns and demonstratives, compared with young normal children and developmentally language-delayed children. Attention-directing language and gestures bring about joint attention (i.e., the process by which two persons' attention is focused on the same object). Joint attention interactions are thought to play a critical role in a young child's learning to use language effectively (Locke, 1978). Our earlier studies examined group differences in joint attention behavior within three different interactive situations, but did not deal with the specific effects of the particular situations on the children's ability to produce joint attention behaviors.

Rationale

The primary objective of the present study was to determine the effect of three different interactive situations, which may vary with respect to a variety of social context factors, on autistic children's use of attention-directing gesture and language. In addition, we were interested in comparing the autistic children's use of these behaviors across the three situations with that of mental age- and MLU-matched developmentally language-delayed (DLD) children and MLU-matched, young normal (ND) children. The three situations used were (a) an Adult-directed situation, in which the adult directed the interaction through specific language and gesture tasks and the child was required to show comprehension of these tasks by using specific kinds of

communication responses, (b) a Requesting situation, in which the adult defined a highly motivating situation for the child (e.g., withholding a treat) and the child was required to make a request of some kind using language or gesture, and (c) a Spontaneous situation, in which the child had the opportunity to initiate freely and determine the nature of the interaction without directives from the examiner.

We hypothesized that across the three situations, the autistic children would use the least attention-directing language and gestures in the Spontaneous situation, because it provides very little information about what is expected of them in the interaction and less interpersonal involvement on the part of the examiner. We based this hypothesis on the observation that autistic children have difficulty structuring their own behavior and initiating interactions and often must rely on specific cues from others to produce particular learned responses (cf. Schopler et al., 1971). Autistic children were therefore expected to use more joint attention behaviors in the Adult-directed situation, than in the unstructured Spontaneous situation. In the Requesting situation, autistic children were also expected to produce more attention-directing language and gesture than in the Spontaneous situation, because of the high degree of motivation associated with the Requesting situation.

Normally developing and language-delayed children do not have special difficulty with joint attention behavior (Landry & Loveland, 1988; Loveland & Landry, 1986) and were not expected to produce more of these behaviors in the Adult-directed versus the Spontaneous situation. Although all of the groups were expected to vary their use of joint attention behaviors to the differing demands of these situations, the autistic children's use of these behaviors was predicted to differ most from that of the other children in the Spontaneous situation, because autistic children would be expected to have the most difficulty producing these behaviors without a high degree of direction and involvement of the examiner.

METHODS

Participants

A group of autistic children, a group of developmentally language-delayed (DLD) children, and a group of normally developing (ND) children were compared for this study, all matched for language level (Sequenced Inventory of Communication Development, SICD; Hedrick, Prather, & Tobin, 1975). The two disabled groups were also matched for nonverbal mental age (Leiter International Performance Scale; Arthur, 1980). Although the autistic and DLD groups could not be matched on chronological age, the range

Table I. Mean Chronological and Mental Ages and Language Levels in Months for Each Group

	Autism (n = 15)			Developmental language delay (n = 14)			Nondelayed (n = 13)		
	$\bar{X}$	SD	Range	$\bar{X}$	SD	Range	$\bar{X}$	SD	Range
Chronological age (months)	104.7	25.8	58–155	64.2	21.8	36–114	29.4	3.8	25–37
Mental age (months)	65.9	22.2	37–129	63.4	14.9	45–102	33.4	6.5	25–45
SICD expressive	34.1	9.2	20–48+	31.2	11.3	20–48+	32.1	4.3	24–38
SICD receptive	36.4	9.5	20–48+	40.6	10.2	30–48+	31.6	5.4	24–38

of ages for the two groups were comparable. The ND group was younger in chronological and mental age than the other two groups (see Table I). Children with sensory deficits and neurological problems (e.g., cerebral palsy, seizure disorders) were not accepted into the study. Table I lists ages, mental ages, and SICD language ages in months for each group. Information on the recruitment procedure, the developmental evaluation, and other aspects of joint attention performance for these same groups were reported in Landry and Loveland (1988).

Because of the importance of measuring attention-directing language, only verbal children were selected. As a result, the autistic group is unrepresentative of the autistic population as a whole, many of whom are nonverbal. Results should therefore be interpreted to apply most directly to verbal autistic children, and should be generalized only with caution to nonverbal autistic children, whose communication development may be different.

The autistic group consisted of 15 children (12 boys and 3 girls) with a primary diagnosis of Infantile Autism according to the criteria stated in the DSM III (American Psychiatric Association, 1980).

The developmental language delay group consisted of 14 children (10 boys and 4 girls) with expressive delays as measured by SICD of at least 1 year below chronological age level. The average amount of expressive delay for this group was 37.6 months (SD = 20.2 months). The average amount of receptive delay for the children in this group was 26.5 months (SD = 18.4 months) (see Table I).

The normally developing group consisted of 13 children (8 boys and 5 girls), 24 to 36 months old. Care was taken to include children whose nonverbal IQ was not greatly above average (mean nonverbal IQ = 113). Children who were not developing within normal limits as assessed by appropriate intelligence and language measures were excluded.

Procedures

Each child was first seen for a developmental evaluation and informed consent was obtained from parents at this time, before testing began. At the second visit, each child was videotaped playing with an examiner in a playroom stocked with toys. A detailed description of the videotaped procedure has been reported in Loveland and Landry (1986). The play procedure was designed to stimulate a natural period of interaction between the examiner and the child. The three context situations were interspersed throughout this play procedure. The situations were not presented in a specific order. However, each child received the same number and types of tasks for each situation. The three context situations are described below.

Adult-Directed Situations. The Adult-directed situation comprised three types of language tasks: *Pronoun tasks.* Without using gesture, the adult initiated interactions that required the child either to produce or comprehend the personal pronouns I/me, you/your, or the demonstratives this/that or here/there. *Gesture tasks.* Without using language, the adult initiated interactions that required the child to comprehend attention-directing gestures, including pointing, showing, gaze shifting, and tapping an object. *Language with gesture tasks.* Using language and gesture together (e.g., a point plus "What's that?"), the examiner initiated interactions that required the child to comprehend combined attention-directing language and gesture. A complete description of the Adult-directed tasks can be found in Loveland and Landry (1986) and Landry and Loveland (1988). The Adult-directed interactions did not provide increased structure in the same way that it had been defined in other studies. For example, in the Clark and Rutter (1981) study, tasks were structured in the sense that the autistic children were expected to respond with a clearly defined behavior such as following a specific routine or carrying out an action with an object. In the present study, the Adult-directed situation provided increased structure in the sense that the examiner established and directed the conversational topic with each language and gesture task. However, each task allowed for the child to respond with a number of different communication behaviors rather than one specific response.

Requesting Situation. In the Requesting situation, each task was arranged to interest the child and create a need for the child to direct someone else's attention. For example, the examiner conspicuously ate a food that was desirable to the child, which was not offered to the child. The child had to indicate a desire for the food in order to obtain some. The child's resulting behavior was therefore not spontaneous but elicited. Any attempt by the child to get the desired result was coded for the presence of attention-directing language or gesture. Each child received the same number and types of tasks.

Table II. Categories of Joint Attention Behavior Coded

Behavior	Explanation
This/that	Any use of this/that as a demonstrative (e.g., "What's that?". "This is a book," "That bear is sad") but not as a conjunction ("He said that he was tired")
Here/there	Any use of here/there as a demonstrative (e.g., "Here it is," "Put it there," "Here are my new shoes")
I/me/my/mine	Any use of I pronouns
You/your/yours	Any use of you pronouns
Looking	A shift in direction of gaze performed either in response to attention-directing behavior (e.g., in following a point) or as part of directing another's attention (e.g., looking at an object while saying "That's a ball")
Pointing	A distal gesture with one finger extended toward, but not touching, the object indicated
Showing	A gesture in which the object indicated is held extended away from the self and toward another person to whom it is displayed
Touching/taking	Touching or grasping the object indicated, including deliberately tapping or banging the object

Unstructured Spontaneous Situation. Because the tasks associated with the Adult-directed situation were distributed as naturally as possible throughout the play session, there was frequent opportunity for the child and adult to interact outside the exchange defined by the tasks. Verbal or gestural initiations by the child during these spontaneous interactions were recorded as the Spontaneous situation. For all children, about one third of the total time was left available for free play/spontaneous interactions. Although the children were not informed that they were in a free play situation, each time the spontaneous situation occurred the examiner followed the child's interest in a specific toy, play activity, or conversational topic and free play was continued for several minutes.

Coding of Videotapes. Behaviors during the Adult-directed situation, Requesting situation, and the Spontaneous situation were coded for the presence of any attention-directing language (this/that, here/there, I/me/my/mine, you/your/yours) or attention-directing gesture (looking, pointing, showing, and touching/taking) (Table II). Attention-directing language (this/that, here/there) was coded only when it created a joint visual focus such as looking at the toy and saying "that one" in response to the

question "Which one is yours?" These attention-directing behaviors were selected because they were aspects of a specific language deficit that characterizes autism (Landry & Loveland, 1988; Loveland & Landry, 1986) and were therefore of interest in relation to how they were affected by social context factors. Other attention-directing words such as "look" and "see" were also coded but they were of such low frequency in all groups that they were not considered for analysis. Correctness or incorrectness of these behaviors was not considered in the present analysis. Data on correct use as well as on amount of initiating for these same groups may be found in Landry and Loveland (1988). In this study, it was not appropriate to distinguish the attention-directing behaviors as initiations or responses for each of the three situations, since the situations were designed to differ with respect to these parameters. Any delayed or immediate echoing was also coded; however, it was found that for all groups, few of the utterances containing attention-directing language were echos (5–10%). Each interaction was coded as an example of the Adult-directed situation, the Requesting situation, or the Spontaneous situation, according to the nature of the interaction and who initiated it. Coding for the videotaped session was performed by two pairs of observers who were blind to the hypotheses of the study. Reliability was calculated for one fourth of all tasks by comparing the judgments of the two pairs across the four situations, using point-by-point percentage agreement. Observers were trained until they reached a reliability of .90. The interrater reliabilities in this study are uniformly in excess of .90.

RESULTS

Multivariate analysis of variance (SPSSx) with repeated measures was used to examine the effect of different communicative situations (Adult-directed, Requesting, Spontaneous) on the use of attention-directing behaviors by autistic, DLD, and ND children in a Group × Behavior × Situation design. One-way analysis of variance with Sheffé follow-up tests was used to examine differences within and between groups where significant multivariate effects were found. The dependent measure of interest for each behavior was the percentage of all the child's communicative acts in each situation that contained that behavior. This dependent measure was chosen instead of the frequency of the behavior per unit of time, because we wished to examine not how often these children communicated, but rather what proportion of their communications included particular types of attention-directing behavior. In addition, a between-task comparison of frequencies would be misleading because of the different number of task probes administered in the Adult-directed and Requesting situations and the differing tendency of the three groups to initiate joint attention in the Spontaneous situation. Inspection of the means, standard deviations, and ranges of the frequencies

for each variable revealed a high degree of variability for all of the groups on most of the variables. Both the autistic and DLD groups had minimum ranges of 0 for approximately 83% of the variables, the normal group for 50% of the variables across the three conditions. Also, the mean percentages of the attention-directing variables, especially for the Requesting and Spontaneous situations, are often based on very small absolute numbers.

Attention-Directing Gesture

The three-way interaction of Group × Behavior × Situation was significant, as were the two-way interactions of Behavior × Situation and Group × Behavior (Table III). Figure 1 shows use of *point, show, look,* and *touch* across the three situations examined. For the behaviors *look* and *touch* (see Figure 1), there were no group differences in percentage of the behavior in a particular situation, and the effect of situation on percentage of use appeared the same for all three groups. However, for the more communicative behaviors *point* and *show,* there were differences within and between groups.

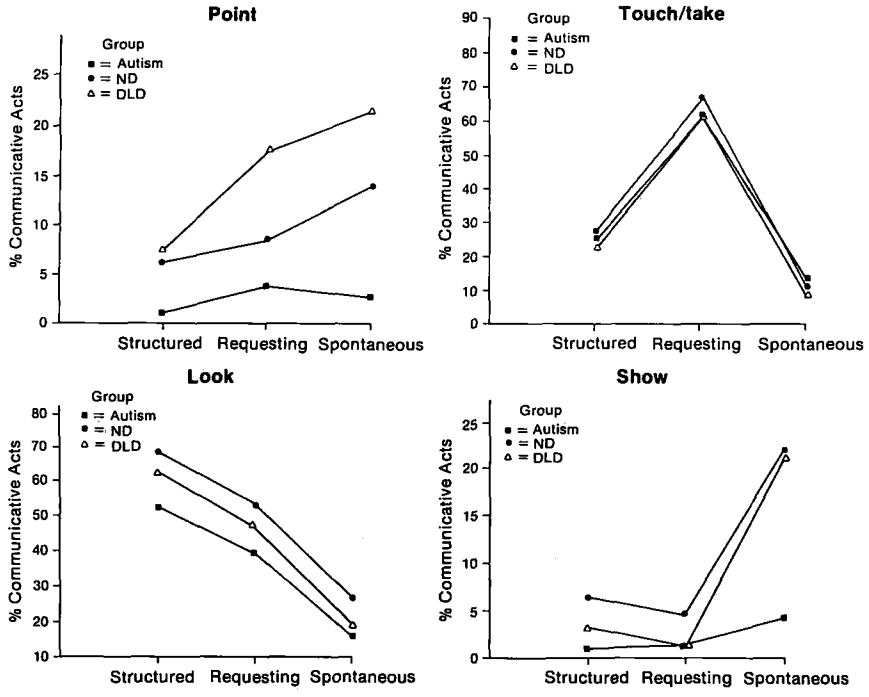

Fig. 1. Percentage of joint attention gestures in total communicative acts for each situation (point, touch/take, look, show).

Table III. Mean Percentages of Attention-Directing Gestures Used by Groups Across Social Context[a]

Group	Point		Show		Look		Touch	
	$\bar{X}$	*SD*	$\bar{X}$	*SD*	$\bar{X}$	*SD*	$\bar{X}$	*SD*
Autism								
Adult-directed	1.1	1.4	0.97	1.1	52.4	18.0	24.9	6.6
Requesting	3.6	11.4	1.3	3.7	39.7	29.3	60.8	27.0
Spontaneous	2.6	3.8	4.2	8.2	15.2	11.8	12.8	8.5
Developmental language delay								
Adult-directed	7.3	7.1	3.2	3.1	67.6	18.0	22.6	10.4
Requesting	17.3	11.8	1.1	2.9	46.9	23.5	60.6	16.3
Spontaneous	21.2	20.6	21.0	11.6	19.0	16.1	8.2	7.3
Normals								
Adult-directed	6.0	4.8	6.3	4.7	68.4	14.8	27.6	11.5
Requesting	8.3	8.3	4.5	7.5	53.3	19.2	66.7	15.1
Spontaneous	13.6	13.2	21.9	15.1	26.8	17.4	11.1	5.7

[a]Group × Behavior × Situation, $F(12, 68) = 2.3, p < .01$; Group × Behavior, $F(6, 34) = 162.9, p < .001$; Behavior × Situation, $F(6, 74) = 2.7, p < .05$.

Showing (see Figure 1) was significantly more frequent among ND than autistic children in the Adult-directed, $t(26) = -4.29, p < .001$), and the Spontaneous situations, $t(26) = -3.93, p < .001$, and more frequent among DLD than autistic children in the Spontaneous situation, $t(27) = -4.54$, $p < .001$. Percentage of showing by autistic children varied little across situations. By contrast, showing was more frequent in the Spontaneous than the Adult-directed situation both for the ND group, $t(12) = -2.41, p > .03$, and the DLD group, $t(13) = -3.29, p < .01$. DLD children also *showed* more in the Spontaneous than the Requesting situation, $t(13) = -3.61, p < .01$.

Pointing was more frequent among DLD than autistic children in all three situations observed, $t(27) = -3.37, p < .01$. Pointing was also more frequent among ND than autistic children in the Adult-directed situation, $t(26) = -3.92, p < .0001$. Across situations, autistic children pointed very little. By contrast, both DLD and ND children pointed more often in the Spontaneous and the Adult-directed situations, $t(13) = -3.29, p < .01$; $t(12) = -2.41, p < .03$, respectively. DLD children also pointed more often in the Requesting than Adult-directed situation, $t(13) = -3.61, p < .01$.

Overall, the analysis of attention-directing gesture indicates that group differences in percentage of use were present only for the more actively communicative gestures *show* and *point,* and that autistic children produced fewer of these gestures than other children. Results further suggest that although the patterns of use for looking and touching were similar for all three groups across the situations examined, patterns of use for showing and pointing were

Table IV. Mean Percentages of Attention-Directing Language Used by Groups Across Social Context[a]

Group	This/that		Here/there		I/my		You/your	
	$\bar{X}$	*SD*	$\bar{X}$	*SD*	$\bar{X}$	*SD*	$\bar{X}$	*SD*
Autism								
Adult-directed	1.4	2.1	1.1	1.7	7.1	6.8	2.3	3.3
Requesting	4.0	6.7	0.58	1.9	19.3	21.2	3.3	6.0
Spontaneous	6.5	7.6	2.8	5.5	23.5	23.2	9.7	6.0
Developmental language delay								
Adult-directed	2.6	2.9	1.5	1.9	12.7	8.7	3.7	4.1
Requesting	9.8	12.6	3.0	5.2	19.2	18.6	1.2	3.4
Spontaneous	16.2	16.4	10.3	11.0	23.6	16.3	3.7	7.7
Normals								
Adult-directed	8.5	10.4	2.3	3.6	11.5	6.0	5.3	3.9
Requesting	6.5	8.6	0.35	1.3	40.8	21.4	4.4	7.2
Spontaneous	26.5	15.5	12.5	7.9	24.7	13.8	8.1	6.3

[a]Group × Behavior × Situation, $F(12, 64) = 3.20, p < .01$; Group × Behavior, $F(6, 74) = 2.94, p < .05$; Behavior × Situation, $F(6, 34) = 7.46, p < .001$.

different for autistic children compared to the other groups. Whereas DLD and ND children produced differing amounts of showing and pointing in response to different situations, autistic children produced very few of these gestures in response to any situation.

Attention-Directing Language

The three-way interaction of Group × Situation was significant, as were the two-way interactions of Behavior × Situation and Group × Behavior (Table IV). Figure 2 shows use of this/that, here/there, I/me, and you/your across the three situations examined. Group differences were found between ND and autistic children in percentage of this/that in the Adult-directed, $t(26) = 2.67, p < .02$, and the Spontaneous, $t(26) = 4.45, p < .02$, situations. For all groups, percentage of this/that was greater in the Spontaneous than the Adult-directed situation (range of t values -2.73 to -7.10, with $p < .02$). DLD children also produced this/that more in Requesting than the Adult-directed situation, $t(13) = -2.33, p < .04$.

ND children used here/there more than autistic children in the Spontaneous situation, $t(26) = -3.81, p < .001$, but no other group differences were present in use of here/there. Across situations, percentage of here/there was greater in the Spontaneous situation than either the Adult-directed or Requesting situation for both ND and DLD children (range of t values -2.64 to -5.55, with $p < .02$).

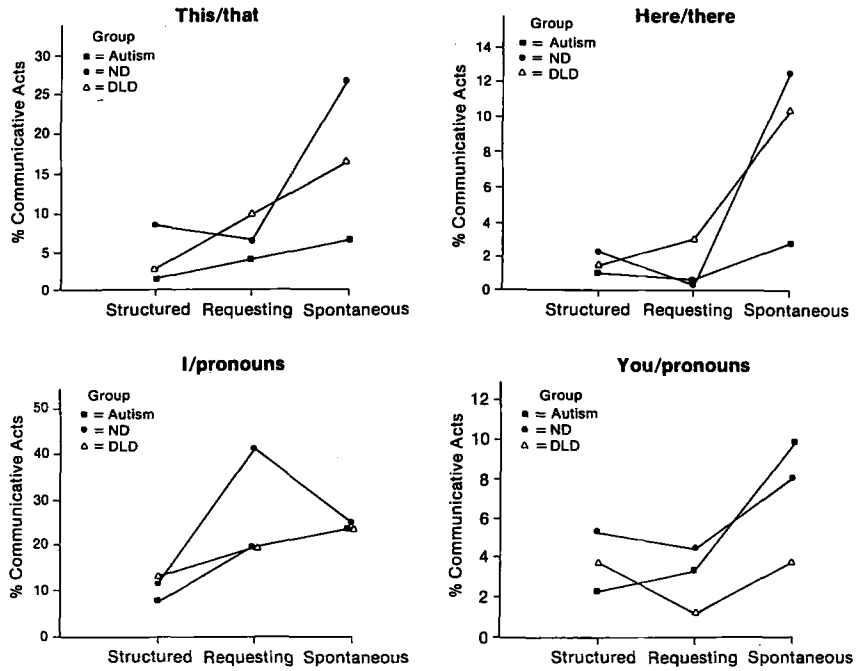

Fig. 2. Percentage of joint attention language in total communicative acts for each situation (this/that, here/there, I/me/mine, you/your/yours).

ND children used I-pronouns more than either DLD, $t(25) = 2.81$, $p < .01$, or autistic children, $t(26) = -2.66$, $p < .01$, in the Requesting situation only. There were no other group differences, and the pattern of use for I-pronouns was very similar across situations for the autistic and DLD groups. By contrast, percentage of I-pronouns used by ND children differed significantly among all three situations (all points significantly different, t values 3.33 to -5.56, $p < .01$).

No group differences in use of you-pronouns were found. Across situations, autistic and ND children produced you-pronouns more in the spontaneous than the Adult-directed situation, $t(14) = -2.47$, $p < .03$; $t(12) = -2.26$, $p < .05$, respectively. ND children also produced you-pronouns more in the Spontaneous than the Requesting situation, $t(12) = -2.36$, $p < .04$.

The analysis of attention-directing language indicates that group differences in percentage of use were present for all the terms examined except you-pronouns. DLD and ND children tended to produce the demonstratives this/that and here/there more often in the Spontaneous than the Adult-directed situation, a trend that was present, but much weaker, for autistic

children. Group differences in use of demonstratives were also greatest in the Spontaneous situation. Surprisingly, few group differences were present in percentage of utterances containing I-pronouns or you-pronouns. Few I-pronouns were produced by DLD or autistic children, but ND children used them often in Requesting. Apart from the Requesting situation, the three groups were very similar in percentage of I-pronouns produced. There were no within- or between-group differences in use of you-pronouns, which were low in frequency for all children.

DISCUSSION

In general, the autistic children used attention-directing behaviors less frequently than the ND or DLD children, and their use of these behaviors varied less with communicative context than that of the other two groups. Results of this study do not support the hypothesis that autistic children will produce more joint attention behavior in interactive situations with a high degree of adult-directed involvement than in spontaneous interactions. Rather, when autistic children were involved in an adult-directed situation, the percentage of their communicative acts containing a particular attention-directing behavior was in most cases less than or equal to the percentage when there was less adult involvement. Exceptions to this trend were the gestural behaviors *look* and *touch,* which seemed to be used by all groups mainly to respond to the adult's behavior (as in the Adult-directed situation), and only rarely to initiate (as in the Spontaneous situation). It was also expected that the Requesting situation, because it involves a high degree of motivation, might facilitate use of attention-directing behavior by autistic children. There was likewise no support for this hypothesis. Instead, most joint attention behaviors examined were as frequently used by autistic children in the Requesting situation as in the Adult-directed situation. This finding contrasts to the results for ND and DLD children, who more often used I-pronouns and pointing, respectively, when requesting.

We also hypothesized that all groups would adapt their use of joint attention behaviors to the demands of the three types of situations, but that autistic children's behavior would differ most from that of the other groups in Spontaneous interactions. Our results tend to support this hypothesis. Even though there was a tendency for the autistic children to use more attention-directing language in the Spontaneous situations, most of the group differences observed occurred in this situation. When interacting spontaneously, ND and DLD children were clearly more likely to produce certain joint attention behaviors than were autistic children (point, show, this/that, here/there).

Taken together, our results suggest that relative to other children, autistic children are poor at using attention-directing behavior, but they are at least as likely to use these behaviors spontaneously as in situations with a high degree of adult direction. Other studies have found improved communication skills for autistic children in situations providing a high degree of direction or responsiveness from others (Bartak et al., 1975; Clark & Ruter, 1981; McHale et al., 1980). Our finding that autistic children did not use more attention-directing behaviors in an examiner-controlled versus a spontaneous situation is somewhat at variance with findings from these other studies. This difference may be related to design and content differences in our study.

The present study investigated the effects of context factors on a group of specific communication behaviors (i.e., attention-directing gestures and verbal skills) whereas other studies investigated the effect of context on broad measures of autistic children's communication (i.e., relevant speech, social responsiveness, continuation of conversations). Also, adult-directed tasks in other studies (Clark & Rutter, 1981), provided children with increased structure by requiring a specific action or routine. The language and gesture tasks in the Adult-directed situation in the present study were not structured in the sense that the children were expected to respond with a clearly defined behavior. In fact, since a number of different communication behaviors were acceptable responses, the autistic children may not have perceived a high degree of direction in this situation.

Another possible explanation for our finding is that the tasks initiated by the examiner may have placed more demands on the autistic children's communication skills by requiring them first to attend to and comprehend the examiner's communicative intent and then to respond appropriately. Lower level communication and exploratory responses to maternal attention-directing behaviors are reported for very young children with developmental problems when they were required to shift attention to their mothers' focus of interest rather than pursuing their own interests (Landry & Chapieski, 1989; Rocissano & Yatchmink, 1983). In the present study, the groups' tendency to use certain attention-directing behaviors (pointing, this/that) more often in the Spontaneous situation may relate to the examiner's tendency during this condition to pursue the child's interest in a particular toy or conversational topic rather than to establish a new topic. Investigating the effect on the autistic child's communication behavior of shifting versus maintaining his/her focus of interest may be an important question to assess in future studies.

Since we also found that the ND and DLD children often used their lowest percentage of attention-directing behavior in the Adult-directed situation, it is worth asking what characteristics of this situation would tend to

decrease differences among the three groups in amount of attention-directing behavior. The Adult-Directed interaction may have inhibited attention-directing behaviors because in these interactions it is the adult who initiates and the child who responds. Attention-directing behaviors are often used to initiate by drawing another person's attention to a topic of interest. They can also be used in response to initiations by others ("Where is *my* shoe?", *"There* it is!"*/point*). In the Adult-directed interaction, the adult's initiations left many opportunities to respond with elaborated joint attention behavior, but it was often equally appropriate to give only a minimal response (e.g., looking in the direction indicated). Children in all three groups produced many minimal responses of this type in the Adult-directed interaction. By contrast, the Spontaneous initiations by the children seemed to call for more elaborated behavior of the types difficult for the autistic group (e.g., pointing while using a demonstrative pronoun).

In addition to differences among the attention-directing behaviors within a particular situation, there were interesting effects across the three situations for the individual language and gesture behaviors. Not only did the situations have a differential effect on looking, and pointing and showing as described above, but *touching/taking* was also used more frequently in the Requesting situation and was rarely used in the other situations by all groups. In addition, the demonstratives (this/that, here/there) were used more often by the normal and DLD groups in the Spontaneous situation compared to the other situations. This finding supports the need to investigate children's communication skills in relation to a range of social context variables.

One aspect of our procedure may have reduced differences among the three situations; Spontaneous interactions occurred interspersed among the Adult-directed and Requesting interactions. There may have been a sense of adult-directed involvement across the entire session, even at those times when direction was not being provided. Spontaneous interactions may have been more similar to the Requesting and Adult-directed interactions under these conditions than they would have been had they been observed at a completely different session. However, our procedure was designed to simulate a natural period of interaction between adult and child, where structured and spontaneous interactions are mixed.

Factors related to group differences in age and intellectual functioning between the normal and autistic group may have contributed to group differences on joint attention measures. The normal group was younger and of higher intellectual status then the autistic group and it is possible that they were more motivated by certain tasks or free play situations. However, the DLD children, who were of similar intellectual functioning and chronological age to the autistic children, also differed from the autistic group on the joint attention measures across situations. Other studies have also reported

specific deficits in attention-directing language and gestures for young autistic children compared with young normal children of comparable mental ages (Mundy et al., 1986). Hence it seems unlikely that differences in the groups' attention-directing behaviors across the situations can be attributed primarily to effects of age and intellectual status.

The results of this study are limited by the fact that only a few social context factors were assessed at one time. It is important in future studies to investigate the effect of additional context factors on autistic children's communication skills. These might include the degree of familiarity of the conversational partner and the interest level of the conversational topic. In addition, only a limited number of attention-directing behaviors were investigated in relation to the context variables. Other communication behaviors such as asking questions, turn taking, or introducing a conversational topic may be affected differently by the social context factors investigated in this study. Finally, reliability of the results of the present study over repeated observations has not been assessed.

In view of these results, it may be that communication training programs for autistic children can be improved by paying greater attention to social context factors (Halle, 1980). The use of varying social factors in remediation programs has been viewed as distracting from autistic children's ability to learn language, because social cues are thought to be too difficult for autistic children to learn (Olley, 1985). Our assessment of communication in a group of verbal autistic children in a spontaneous social situation shows that they can use language and gestures to direct others' attention. Determining which communication skills autistic children do have is an important first step in designing effective interventions; the next step is to find ways to facilitate their use of these skills in more natural and diverse social situations (Halle, 1988). Methods to improve autistic children's grasp of the functional aspects of communication should receive high priority in planning for future research.

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