

## COMPREHENSION OF INDIRECT REQUESTS IN ADULTS WITH AUTISTIC DISORDERS AND MENTAL RETARDATION

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Eight adults with autistic disorders and 8 IQ-matched, mentally retarded (MR) subjects were given a task involving the comprehension of indirect requests. In one condition, requests were prefaced by instructions making their illocutionary force clear (*I'm going to tell you to color some circles*). In a second condition, the same requests were presented in an unstructured conversation. Although the performance of the MR subjects was better in both conditions, both groups performed similarly to normal 4- to 6-year-olds. In the unstructured condition, however, the autistic group's performance was significantly depressed, especially on sentences requiring greater semantic processing. The implications of these findings for understanding language and social deficits in autistic and similar individuals are discussed.

Although peculiar characteristics of speech are among the classical features of autism, recent studies (Fay & Schuler, 1980; Tager-Flusberg, 1981a) have suggested that comprehension of language is also seriously impaired in this syndrome. In addition, the ability to use language to accomplish its social functions is consistently found to be disordered. Several researchers (Ball, 1978; Baltaxe, 1977; Baltaxe & Simmons, 1983) reported deficits in the use of rules for dyadic conversation, the management of topic-comment relations, and the use of other rules for governing the speaker-hearer relationship. Pilot studies of conversational skills in autistic adults (Paul & Feldman, 1984) suggested that one aspect of the pragmatic difficulties seen in autistic individuals is an inability to infer what information the interlocutor has in mind. This inability was manifested in the pilot studies in several ways: (a) a difficulty in focusing on the appropriate aspect of a topic (e.g., when asked, "What have you been doing these last few years?" the autistic person replied, "What do you mean last few years? It's not quite a couple of years, it's a year and a half."); (b) a difficulty in adhering to Grice's maxim of quantity in providing the appropriate amount of information in response to questions (e.g., when asked, "Did you and your sister do anything else besides rake leaves?" the autistic person replied, "Yes."); and (c) a difficulty in deriving the speaker's illocutionary intent (e.g., when asked, "Can you tell me about your group home?" the autistic person replied, "Yes.") It seemed possible that some of the difficulties in use of pragmatic structures so frequently reported in this population might be related to deficits in the comprehension of these structures in conversation, that is, comprehension of linguistic foregrounding devices used to establish topics, comprehension of presuppositional devices, and comprehension of the illocutionary force of conventional indirect speech acts.

The present study examined the comprehension of one commonly used pragmatic device—the conventional indirect request. Indirect requests are those sentences in which the illocutionary intent of the utterance does not

match the surface form. For example, "Can you pass the salt?" is on the surface a yes/no question. Yet, in most situations in which it is used, the intended force of the utterance is not to obtain an answer to the question but to have the salt passed. Conventional indirect requests are generated by questioning or referring to preparatory or sincerity conditions for the request speech act.

In a study of normal children's comprehension of indirect requests varying in the complexity of their surface forms, Carrell (1981) showed that children between 4 and 7 years of age understood a wide variety of indirect requests and that the same types of requests that were more difficult for adults (required more processing time) were acquired later by children. In Carrell's task, children were given two different crayons and a sheet of paper with circles drawn on it. They were told that they would be instructed to color each circle a particular color. Thus, as Carrell pointed out, this task removes the necessity for the child to decide that a particular statement is intended as a request. In Carrell's procedure, then, the child's only task was to ascertain the direction of the request; that is, did it direct the child to use the red or the blue crayon. Carrell suggested that a logical extension of this task would be to look at it in a conversational context, in which children would have to decide not only the meaning of the request forms, but also whether or not they were requests at all. In the present study, the same request forms employed by Carrell were presented to autistic and retarded subjects both in a structured context similar to the one she used and in a conversational context. In this way it was possible to compare subjects' performance on the task to that of normal 4- to 7-year-olds. In addition, the study compared differences in performance between the diagnostic groups when the task required subjects to infer illocutionary intent in an unstructured setting. These differences, if found, can help to shed light on the reasons for deficits in pragmatic performance so frequently noted in individuals with autism.

## M E T H O D

*Subjects*

Two groups of subjects were used in this study: one containing individuals diagnosed as autistic or having pervasive developmental disorder (PDD) and the second containing those diagnosed as mentally retarded. The experimental group consisted of 8 young adults satisfying the diagnostic criteria for pervasive developmental disorders. This category was established in the *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed.) of the American Psychiatric Association (1980) to include classic infantile autism, as well as disorders that share many features of autism but may not involve the full syndrome. Subjects showed specific distortions in language, social relatedness, and responses to the environment that could not be accounted for by mental retardation alone. Four satisfied diagnostic criteria for infantile autism and 4 for atypical pervasive developmental disorder. All had been diagnosed as autistic or autistic-like in childhood by a psychiatrist or a developmental pediatrician experienced with autistic children.

All PDD subjects were residents in a university-affiliated school for autistic individuals. Teachers at the school were asked to recommend for inclusion in the study all students who used speech to communicate and combined words to form sentences. It was believed that this criterion would provide subjects with mental ages in the 4- to 7-year range that would be similar to those of Carrell's (1981) normal children. There were 7 men and 1 woman in this sample, whose mean age was 22.3 years ( $SD = 1.8$ ). Average Wechsler Adult Intelligence Scale (WAIS) (Wechsler, 1976) performance IQ (PIQ), from school records of testing done within 18 months of the study, was 63.3 ( $SD = 15.8$ ). All subjects had lived at home until adolescence.

The contrast group consisted of 8 mentally retarded individuals (3 men and 5 women), who were participants in a sheltered workshop and lived either with family members or at a residential center. Their mean age was 27.9 ( $SD = 3.6$ ). Their average WAIS PIQ, as tested by the first author, was 69.2 ( $SD = 7.0$ ). (These subjects were given IQ tests by the experimenter because they were not enrolled in an educational program and did not have current IQ scores on file.) There were no significant differences in performance IQ between the the PDD and MR groups ( $t = 0.96$ ,  $p > .3$ ). Previous data on this population (Paul & Cohen, in press) indicate that there are differences on a variety of language measures between these two groups, despite their similarity in PIQ. These differences are discussed in detail in Paul and Cohen (in press).

*Stimuli*

The requests used as stimuli were taken from Carrell (1981), after Clark and Lucy (1975). These requests ap-

TABLE 1. Sentences used in individual request task.

Pairs	Basic sentences
1(a)	Please color the circle blue.
(b)	Please don't color the circle blue.
2(a)	Can you make the circle blue?
(b)	Must you make the circle blue?
3(a)	Why not color the circle blue?
(b)	Why color the circle blue?
4(a)	I would love to see the circle colored blue.
(b)	I would hate to see the circle colored blue.
5(a)	You should color the circle blue.
(b)	You shouldn't color the circle blue.
6(a)	Shouldn't you color the circle blue?
(b)	Should you color the circle blue?
7(a)	The circle really needs to be colored blue.
(b)	The circle doesn't really need to be colored blue.
8(a)	Doesn't the circle really need to be colored blue?
(b)	Does the circle really need to be colored blue?
9(a)	I'll be very happy if you make the circle blue.
(b)	I'll be very sad if you make the circle blue.
10(a)	I'll be very sad unless you make the circle blue.
(b)	I'll be very happy unless you make the circle blue.

*Note.* From "Children's Understanding of Indirect Requests" by P. L. Carrell, 1981, p. 332. Copyright 1981 by Cambridge University Press. Reprinted by permission.

pear in Table 1. The stimulus sentences consisted of 40 sentences constructed from 10 basic pairs. That is, each of the 20 test sentences was given twice—once with the word *blue* and once with *red*. The sentences themselves had originally been selected by Clark and Lucy to represent a number of syntactic and pragmatic categories. The task always began with a pair of direct requests (i.e., *Please color the circle blue*; *please don't color the circle blue*). The remaining pairs varied the use of sincerity and preparatory conditions to imply requests. Requests 2a and 2b (see Table 1) varied addressee-based, preparatory conditions (*Can you?* *Must you?*); requests 3a and 3b were derived from addressee-based reasonableness conditions (*Why?* *Why not?*); requests 4a, 4b, 9a, 9b, 10a, 10b made use of speaker-based sincerity conditions (*I would love*, *I would hate*). In addition, the requests varied in syntactic form. Some were imperatives (1a, 1b), some declaratives (4a, 4b, 5a, 5b, 7a, 7b, 9a, 9b, 10a, 10b), and some interrogatives (2a, 2b, 3a, 3b, 6a, 6b, 8a, 8b). Finally a semantic variable was also present in the stimuli. Each pair consisted of a positive and corresponding negative sentence. The first sentence (a) conveyed a request to color a circle the named color. The second sentence (b) conveyed a negative request—to color the picture with the crayon opposite to the one named.

*Procedures*

The subjects were tested individually in two separate sessions. In the first (structured) session following Carrell (1981), subjects were given a red and a blue crayon. They were told, "I'm going to ask you to color some circles. Color them either red or blue, according to what I say."

TABLE 2. Percentage correct responses for two conditions in each diagnostic group.

Stimulus sentences	PDD (n = 8)		MR (n = 8)	
	Structured	Pragmatic	Structured	Pragmatic
1a Please do	93.8	75.0	100.0	100.0
1b Please don't	87.5	18.6	87.5	75.0
2a Can you?	93.8	100.0	100.0	100.0
2b Must you?	25.0	0.0	75.0	75.0
3a Why not?	75.0	68.8	93.8	93.8
3b Why?	43.8	0.0	50.0	50.0
4a I'd love	100.0	50.0	100.0	100.0
4b I'd hate	43.8	25.0	87.5	87.5
5a You should	87.5	87.5	100.0	100.0
5b You shouldn't	81.3	12.5	87.5	81.3
6a Shouldn't you?	81.3	75.0	100.0	81.3
6b Should you?	37.5	18.8	56.3	43.8
7a It needs	100.0	87.5	100.0	100.0
7b It doesn't need	75.0	12.5	87.5	87.5
8a Doesn't it need?	68.8	50.0	75.0	75.0
8b Does it need?	18.8	6.3	87.5	62.5
9a I'll be happy if	93.8	87.5	100.0	100.0
9b I'll be sad if	62.5	31.3	68.8	56.3
10a I'll be happy unless	68.8	50.0	87.5	100.0
10b I'll be sad unless	18.8	6.3	18.8	25.0

Before beginning the test, practice items were given using the instructions: *Color this circle red* and *Don't color this circle red*. For each item, each subject was handed a small piece of paper with a circle drawn on it. The subject's responses were recorded on a score sheet by the examiner as the subject colored the circle. Stimulus sentences were read as often as necessary to elicit a response from the subject. Normal stress and intonation for conveying a request were used in reading the stimuli. Sentences were presented in two different random orders, with two direct requests (*Please color*; *please don't color*) always appearing first.

In the second session, called the *pragmatic* session, subjects were again tested individually. Each was engaged in conversation with the examiner around a drawing task. The subject was again given two crayons. The examiner encouraged the subject to draw pictures with the crayons and talked about the subject's drawings. Intermittently throughout the conversation, the experimenter read one of the stimulus sentences from the same randomly ordered list used in the first session. These instructions were inserted at a point when the subject had completed drawing something and could now reasonably be asked to color it. Thus, children were not already coloring something when the request was made. Only the word *circle* in each request was changed to correspond to an item the subject had drawn (*I'll be happy if you color this house blue*). Color choices were again recorded by the examiner on a score sheet as the subject gave a response. Any response that indicated appropriate comprehension of the request was considered correct. For example, if the experimenter said, "I'll be happy unless you color this blue," and the subject replied, "But I want to color it blue" and did so, this was considered correct. It should be noted that this type of response was infrequent, possibly because of conditioning from the structured task. More frequently, subjects answered the requests verbally

TABLE 3. Means (and SDs) of total raw scores for two diagnostic groups in two structure conditions.

Group	Condition		Difference
	Structured	Pragmatic	
PDD	27.1 (4.3)	17.5 (3.8)	9.6*
MR	33.3 (6.1)	31.6 (5.8)	1.7
Difference	6.2*	14.1*	

\*Significant difference at  $p < .01$  for Dunn's critical value = 3.7 with 14 degrees of freedom and mean square error = 1.9.

and then complied with them ("Must you color this house blue?" "No, I'll color it red").

## RESULTS

The percentages of correct responses (combining corresponding *red* and *blue* items) for each sentence by each diagnostic group in each condition appear in Table 2.

Table 3 lists the mean total raw score (out of 40) for each of the two diagnostic groups in each of the two structure conditions. Dunn's multiple comparison procedure for planned, nonorthogonal comparisons (Kirk, 1968) was used to analyze these data. The tests showed that there were significant differences ( $p < .01$ ) between the PDD and MR subjects in both the structured and pragmatic conditions and that the PDD group performed significantly better in the structured condition than in the pragmatic one. The MR group's performance remained stable across conditions.

To evaluate the responses of the PDD group to various aspects of the stimulus sentences, six more contrasts were made using Dunn's procedure. The percentage correct scores on which these comparisons were based are pre-

TABLE 4. Percent correct responses to two sentence condition pairs for two diagnostic groups in two task conditions.

Sentence condition	Group			
	PDD		MR	
	Structured	Pragmatic	Structured	Pragmatic
Positive	86.3	73.1	95.6	77.5
Negative	49.4	13.1	70.6	80.6
Difference	36.9	60.0*	25.0	3.1
Declarative	76.0	45.3	85.4	81.8
Interrogative	55.5	39.8	79.7	75.0
Difference	20.5	5.5	5.7	6.8

\*Significant difference at  $p < .05$  for Dunn's critical value = 1.14 with 266 degrees of freedom, mean square error = 0.25.

sented in Table 4. First, a semantic comparison between positive (those requiring a response with the named color—*You should color the circle blue*) and negative requests (those requiring a response with the opposite color—*You shouldn't color the circle blue*) was made. For the PDD group, there were no differences in the structured condition, but in the pragmatic condition there was a significant difference in favor of the positive sentences. Since there were no overall differences between the two conditions in the MR group, and since the largest difference between sentence types occurred in the structured condition, comparisons were made only in this condition. Data showing differences in both task conditions for the MR group are presented in Table 4. No difference was found on this measure for MR subjects.

A syntactic comparison examining the difference between requests in declarative form and those in interrogative form was also made (see Table 4). No significant differences were found for either of the two conditions in the PDD group. The MR group also showed no significant difference in performance on this measure. This result corresponds to Carrell's (1981) finding in normal children.

To look at the relation of responses to chance levels of performance, the number of correct responses to each item (0, 1, or 2) was summed for each group. These sums were then converted to percentage of the total possible correct score for each item (16) and designated as above ( $\geq 75\%$ ), at (26–74%), or below ( $\leq 25\%$ ) chance. Thus, scores of 4 and below were considered below chance. Scores of 5–11 were considered chance, and scores at or above 12 were considered above chance. These designations correspond to those used by Tager-Flusberg (1981a) for evaluating chance performance in her study of comprehension in autistic children. The percentage of items that fell into each of these categories for each of the two groups in each of the two structure conditions is presented in Table 5. As can be seen there, the great majority of items were responded to by the MR group at above chance levels. The only items that elicited chance level performances were 3b, 6b, 8b, 9b, and 10b. Four of these

TABLE 5. Percentage of items with response rates occurring above, within, or below chance.

Group	Above ( $>75\%$ correct)	Within (74–26% correct)	Below ( $<25\%$ correct)
PDD			
Structured condition	55	30	15
Pragmatic condition	30	30	40
MR			
Structured condition	80	15	5
Pragmatic condition	75	25	0

5 were also the 4 items ranked highest in difficulty for normal children (Carrell, 1981). The PDD group performed at chance level on 30% of the items in both conditions and below chance performance on 40% of the items in the pragmatic condition. These items were primarily the negative requests, to which PDD subjects responded by choosing the color named rather than its opposite.

## DISCUSSION

Although matched for nonverbal IQ scores, the PDD and MR groups differed in response to this verbal task. The language data presented in Paul and Cohen (in press) indicate that the PDD group scores generally lower on a variety of verbal measures than an MR group matched for nonverbal IQ. If the only deficit operating here were a general depression in language comprehension skills, one would expect the PDD group to perform comparably in both the structured and pragmatic conditions. The decrement in performance in the pragmatic condition would seem to be related not only to poor receptive skills, but also to a more specific difficulty in deriving the illocutionary force of a speech act when it has not been made explicit. This inability to infer a speaker's intention corresponds to findings by Sigman, Ungerer, and Mundy (in press), indicating that one of the primary deficits in autism and related disorders is seen in the area of social cognition, specifically, the ability to understand another's point of view. We have argued (Paul & Feldman, 1984) that one essential aspect of this deficit is the inability to evaluate another's cognitive state, to decide what ideas and intentions the listener may have in mind. This inability to enter into shared frames of reference results in a variety of pragmatic disabilities over and above any purely linguistic deficits.

The difficulty seen in the pragmatic condition with requests conveying choice of the color opposite to the one named is similar to that found by Carrell (1981) for normal children in her structured task. It is interesting that this difficulty appears only in the PDD group and only in the pragmatic condition. In the structured condition, which is analogous to that used by Carrell, both PDD and MR groups show no decrement in performance on these negative items. The subjects in the present study, then,

appear to be performing better than normal children in the 4- to 7-year age group. This may be due to the fact that, with IQs in the 60–70 range, these subjects' mental ages are probably above 7 years. But, when they must infer the intention of the request, the PDD group's performance more closely resembles that of young children. Deriving both the meaning and the intention of these negative requests provides particular difficulty for the autistic group.

Although below-chance results such as those seen here are sometimes taken to indicate negativism, or purposefully wrong performance by autistic individuals, it is more likely that this performance reflects the operation of a comprehension strategy (Chapman, 1978). Comprehension strategies are used by young children in an attempt to respond to sentences beyond their linguistic competence. Because of the generally high rate of compliance seen in this task, it appears unlikely that the PDD subjects would decide to be willfully negativistic only on the negative items in the pragmatic condition. Rather, as Volkmar, Hoder, and Cohen (1984) have pointed out, noncompliance here is probably the result of failure to comprehend the message.

In the structured condition, then, the present subjects performed as well as or better than normal 4- to 7-year-olds on processing semantic and syntactic aspects of the requests. In the pragmatic condition, syntactic processing—as indexed here by the declarative/interrogative distinction—was not disturbed. Semantic processing, in the context of positive/negative requests, was influenced in the PDD group when the difficulty of inferring pragmatic intention was added. These results parallel the suggestion of Tager-Flusberg (1981b) that syntactic processing is commensurate with developmental level, whereas semantic and pragmatic processing present more difficulties for this population. These difficulties may become more apparent in situations such as the less structured second condition here that demand integration of the latter types of processing.

In summary, these results indicate that, in general and like MR controls, mildly-to-moderately retarded adults with PDD respond similarly to normal children in a structured task requiring responses to indirect requests. Their responses differ from IQ-matched controls when the task requires the addition of pragmatic processing abilities—in this case, the ability to infer the intention of an indirect speech act. Semantic difficulty seems to add more complications than does syntactic difficulty in the pragmatic processing task. While the present study looks only at a very small subset of the pragmatic demands of natural language situations, these results offer support for the notion that autistic and similar children and adults are impaired in the ability (a) to extract implicit or implied information about the speaker's cognitive state and intentions and (b) to use this knowledge to aid in language processing and in formulating an appropriate response.

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## REFERENCES

- AMERICAN PSYCHIATRIC ASSOCIATION. (1980). *Diagnostic and statistical manual of mental disorders* (3rd. ed.). Washington, DC: Author.
- BALL, J. (1978). *A pragmatic analysis of autistic children's language with respect to aphasic and normal language development*. Unpublished doctoral dissertation, Melbourne University, Australia.
- BALTAXE, C. (1977). Pragmatic deficits in the language of autistic adolescents. *Journal of Pediatric Psychology*, 2, 176–180.
- BALTAXE, C., & SIMMONS, J. (1983). Communication deficits in the adolescent and adult autistic. *Seminars in Speech and Language*, 4, 27–42.
- CARRELL, P. (1981). Children's understanding of indirect requests: Comparing child and adult comprehension. *Journal of Child Language*, 8, 329–345.
- CHAPMAN, R. (1978). Comprehension strategies in young children. In J. Kavanaugh & W. Strange (Eds.), *Language in the laboratory, school, and clinic* (pp. 308–327). Cambridge, MA: MIT Press.
- CLARK, H., & LUCY, P. (1975). Understanding what is meant from what is said: A study in conversationally conveyed requests. *Journal of Verbal Learning and Verbal Behavior*, 14, 56–72.
- FAY, W., & SCHULER, A. (1980). *Emerging language in autistic children*. Baltimore: University Park Press.
- KIRK, R. (1968). *Experimental design: Procedures for the behavioral sciences*. Belmont, CA: Brooks/Cole.
- PAUL, R., & COHEN, D. (in press). Responses to contingent queries in adults with autistic disorders and mental retardation. *Applied Psycholinguistics*.
- PAUL, R., & FELDMAN, C. (1984, May). *Communication deficits in autism*. Paper presented at Institute for Communication Deficits in Autistic Youth, Columbia University, New York.
- SIGMAN, M., UNGERER, C., & MUNDY, P. (in press). Cognitive functioning in autistic children. In D. Cohen & A. Donnellan (Eds.), *Handbook of autism and pervasive developmental disorders*. New York: Wiley.
- TAGER-FLUSBERG, H. (1981a). Sentence comprehension in autistic children. *Applied psycholinguistics*, 2, 5–24.
- TAGER-FLUSBERG, H. (1981b). On the nature of linguistic functioning in early infantile autism. *Journal of Autism and Developmental Disorders*, 11, 45–56.
- VOLKMAR, F., HODER, E. L., & COHEN, D. J. (1984). *A naturalistic study of negativism in autistic children*. Manuscript submitted for publication.
- WECHSLER, D. (1976). *Wechsler Adult Intelligence Scale*. New York: Psychological Corporation.

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