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Communication Deviance, Attention, and Schizotypy in Parents of Schizophrenic Patients

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Singer and Wynne's measures of communication deviance were adapted for use with conversational speech and applied to audiotaped speech samples of schizophrenic patients, their parents, and matched nonpsychiatric control subjects. The parents demonstrated levels of language disturbance similar to those of the patients and higher than those of controls. Language deviance in the parents was positively associated with distractibility on a matched-task digit-span measure of attention and with severity scores on a separate schizotypy scale. These findings are discussed with respect to possible cognitive variables underlying the language disturbances and their potential relevance to schizophrenic etiology.

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In the 1960s, Singer and Wynne developed measures of communication deviance (CD) which, when applied to verbatim transcripts of projective test protocols, discriminated parents of schizophrenic patients from parents of nonpsychotic patients and normal controls (Singer and Wynne, 1965). An early effort at replication of their work was disappointing (Hirsch and Leff, 1975), but since then, Singer and Wynne's significant between-group differences have been confirmed by other investigators, either by using the traditional projective test protocols (Johnston and Holzman, 1979; Jones, 1977) or by adapting the measures and using them on verbatim records of object-sorting test sessions (Wild et al., 1965) or on transcripts of family therapy sessions (Morris and Wynne, 1965). In the present study, we adapted these measures for use with free speech and applied them to 10-minute conversational speech samples. We had two major aims in this study. First, we wanted to show that parents of schizophrenic patients as a group demonstrate this kind of language deviance, not only in projective testing situations or in interactions with their disordered offspring, but also in everyday speech with a competent conversant, and that this is true of parents with no history of psychotic symptoms in themselves. Second, we wanted to examine some of the correlates of these communicative anomalies toward a clearer understanding of the cognitive underpinnings of language deviance in these "unaffected" parents.

Singer and Wynne did not profess to be studying thought disorder in parents, but, rather, characteristics of their communication that might be detrimental to their offspring's cognitive development in ways that could lead to their becoming schizophrenic. An alternative explanation for the higher-than-normal levels of CD in patients' parents is that they reflect a genetic vulnerability to schizophrenia. Singer and Wynne had conceptualized CD as a measure of an individual's difficulty in establishing and maintaining a shared focus of attention with another person. In the present study we wanted to test the hypothesis that the deviance that we expected to find in parents' speech might be related, at least in part, to a primary attentional deficit, whether innate or acquired.

Some measure of support for this kind of association was provided by Wagener et al. (1986), who assessed CD in groups of mothers of schizophrenic patients, and also tested them with a visual Continuous Performance Test (CPT) and a Span of Apprehension Test (SAT). Although they did not find a relationship between overall CD ratings and performance on the tests, they did find that some particular facets of CD, defined using the CD factors derived by Jones (1977), were related to the attentional and information processing measures. In another study, Nuechterlein et al. (1989) found that poor signal discrimination scores in schizophrenic patients, derived from their CPT and SAT performances, were associated with high scores on two factors of CD in their mothers. Mothers with psychiatric disorders were not excluded from either of these studies. Therefore, it is possible that overt mental illness in some of the patients' mothers was responsible for the associations found. Another concern is that low scores on the cognitive measures used in these studies could have been due to a generalized performance deficit rather than a specific attentional impairment. In the present study we wanted to test for an association specifically between attention and language deviance in parents with no history of overt mental illness. We assessed attention using a matched-task digit span mea-

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sure of auditory distractibility that had previously been found to discriminate between schizophrenic patients and normal controls (Oltmanns and Neale, 1975) and between children of schizophrenic patients and children of normal controls (Harvey et al., 1981). The matched-task method was used to control for generalized cognitive deficits, *i.e.*, to insure that we were measuring distractibility apart from other factors involved in digit-span performance (see Oltmanns and Neale, 1975). Our expectation was that language deviance in parents would be positively associated with distractibility on this measure.

We also wanted to see whether this kind of language deviance was associated with other variables believed to reflect a vulnerability to schizophrenia. To this end, we administered an established schizotypy scale, with the expectation that there would be a positive association between scores on this scale and language deviance. We also tested for correlations between language ratings and particular elements of schizotypy. We expected to find an association between language deviance and perceptual illusions, because misperceptions of projective stimuli were prominent indicators of CD in Singer and Wynne's work using Rorschach and Thematic Apperception Test (TAT) cards. Beyond that, we did not have specific predictions as to which elements of the schizotypy scale might correspond to language deviance ratings. To this extent, the final part of the study was exploratory.

Method

Subjects

Patients. Patient subjects were 10 schizophrenic outpatients who had both parents available, healthy, and willing to participate. These subjects were recruited from the population in treatment at an urban public mental health clinic. Individuals currently involved in substance abuse were excluded, as were those with indications of possible organic disorder. All were taking neuroleptic medications and were considered clinically stable at the time of the study. Diagnoses were made according to DSM-III-R criteria based on information from the Schedule for Affective Disorders and Schizophrenia, Lifetime Version (SADS-L) diagnostic interview. Diagnoses were decided by the principal investigator (PI), who had attained a high level of interrater reliability for the diagnosis of schizophrenia using the SADS in an earlier study, Kappa = .88 (Docherty et al., 1988).

Parents. Parent subjects (18) included both parents of nine of these patients. One parent of the 10th patient decided not to participate, so neither member of that pair was included in the analysis. We limited our sample to parent pairs so that we would not run the risk of assessing only the healthiest of a patient's parents. The SADS-L was also administered to these subjects. None had any history of psychiatric hospitalization or of psychotic symptoms.

Controls. Control subjects were 10 parents who were comparable in age, sex, race, socioeconomic status, and education to the patients' parents, with no history of psychiatric hospitalization or psychotic symptoms in themselves, as assessed using the SADS-L, or in any of their offspring, based on subject report. These individuals were recruited either from clinic support staff or from a local senior citizens' center.

Descriptive data for the subjects are presented in Table 1.

Procedures

Speech samples. Subjects provided 10-minute conversational speech samples on standardized pleasant or neutral topics (*e.g.*, hobbies, interests, siblings' occupations) according to a semistructured protocol. The interviewer asked relevant, open-ended questions on the designated topics, avoiding any discussion of symptoms or mental-health–related issues. The speech samples were audiotaped.

Language deviance. The categories and criteria we used for measuring language deviance were based on Velligan et al.'s (1990) adaptations of the work of Singer and Wynne (1965) and Doane and Singer.[2] We used the same eight categories but made a few changes to their criteria toward suiting the measures to use with conversational speech samples. These modifications are available upon request. We wanted to assess parents' ongoing individual cognitive characteristics, as reflected by linguistic style, rather than situation-specific characteristics of their communications with their disordered offspring around conflictual issues, as Velligan et al. had done. The eight categories are defined in Table 2. Our intent, similar to that of Singer and Wynne, was to code patterns of speech that were amorphous, obscure, or fragmented. Peculiar language was scored if it tended to impair comprehensibility. Colloquialisms and simple grammatical errors per se were not considered deviant. Scores were computed by summing the total number of occurrences of deviance and dividing by the number of independent clauses in the speech sample. This was done to control for differences in amounts of speech obtained from different subjects. The same method was used to determine scores on individual categories of deviance.

The PI and a research colleague (psychiatrist) studied the manuals of Singer and Wynne (1966) and Velli-

[2]Doane JA, Singer MT (1977) *Communication deviance scoring manual for use with the consensus Rorschach.* Unpublished manuscript, University of Rochester.

TABLE 1
Descriptive Information for Subjects[a]

	Patients	Parents	Controls
Number of subjects	10	18	10
Percentage female	10	50	50
Percentage Caucasian	50	55	60
Age	31.3 ± 6.1	61.9 ± 6.3	61.3 ± 8.7
Education	12.0 ± 2.1	11.7 ± 4.3	11.5 ± 2.3
Occupation[b]	6.7 ± 0.9	5.1 ± 2.0	5.2 ± 1.4
Global assessment of functioning[c]	48.1 ± 7.8	77.8 ± 4.2	80.1 ± 3.2

[a]Values are $\bar{X}$ ± SD.
[b]According to Hollingshead and Redlich Scale (1965); 1 = highest, 7 = lowest.
[c]According to DSM-III-R scale; 1 = lowest, 90 = highest.

gan[3] and a set of scored transcripts from Johnston and Holzman (1979). They applied Velligan et al.'s criteria, adapted for use with natural speech samples, to transcripts of conversational speech. They attained a high level of interrater reliability using this method. Two research assistants were then trained to a high level of reliability with the PI, through a series of weekly meetings and the scoring of many "practice" transcripts. The two raters then scored all the speech samples, blind to subjects' identities, diagnoses, and other variables. A randomly selected 30% of the speech samples were rated independently by both raters. The interrater reliability of total language deviance scores was extremely high, Intraclass r = .95. Reliabilities for specific categories of deviance were generally at acceptable levels, with the exception of "contradictions," which had low reliability but which occurred relatively infrequently. A coefficient for the category "reiteration" could not be computed because it occurred only six times in the whole sample and not at all in the reliability subsample. These data are presented in Table 3.

Attention. We administered an audiotaped digit-span test with distraction and nondistraction conditions, following a method developed by Oltmanns and Neale (1975). The nondistraction trials each consisted of six digits presented in a female voice at the rate of one every 2 seconds. In the distraction trials, the same female voice presented five digits at the same rate, while a male voice presented four "distractor" digits between each two target digits. Subjects were instructed to attend only to the female voice and to ignore the male voice. At the end of each trial, subjects were asked to recall the digits presented by the female voice in the same order as presented. The two conditions were matched for difficulty to ensure that poorer performance in the distraction condition did not simply indicate a greater generalized performance deficit, but a specific response to the distractors, as discussed by Oltmanns and Neale. Trials were scored by counting the number of correct digits recalled and then subtracting one point for each error of commission or order. Distractibility scores were derived by subtracting total scores in the distraction condition from total scores in the nondistraction condition.

Schizotypy. The Schedule for Schizotypal Personalities (Baron et al., 1981) was completed for each parent and control subject. This is a structured interview-based instrument which contains 10 scales designed to assess different aspects of schizotypy: perceptual illusions, depersonalization, ideas of reference, suspiciousness, magical thinking, inadequate rapport, odd communication, social isolation, social anxiety, and transient delusions/hallucinations. The "odd communication" scale reflects subjects' responses to items inquiring into communication difficulties, rather than anomalies of communicative behavior actually demonstrated in the interview. Thus, it really represents a level of *awareness* of communication problems. There are two scores for each scale. One is a severity score, which is computed by finding the mean severity score for all the items in the scale. The other is a statement score, which reflects whether or not any items in that particular scale were endorsed. Total schizotypy scores are computed by summing the scale scores, yielding a global severity score and a global statement score. This interview was done after the speech samples had been collected, by an interviewer who was blind to subjects' performance on the other variables.

Analysis

The analysis was done in two parts. First, we compared levels of language deviance between groups. Parents were compared with controls and with patients. Because the control subjects were matched to the parents in age, and therefore were considerably older than the patients, we did not compare patients with controls. Second, we examined associations within groups between language deviance and the attentional and schizotypy variables. We used nonparametric statistics throughout, because the groups were rather small and

[3]Velligan D (1986) *CD coding manual for family interactions.* Unpublished manuscript, UCLA.

TABLE 2
Categories and Definitions of Language Deviance[a]

Category	Definition	Example
Uncompleted remark	Subject begins a statement but never completes it.	*He cut* . . . he was on Hitler's side.
Unintelligible remark	Subject makes an incomprehensible remark, or one that shows peculiar reasoning.	I do things right, and *that sort of the other thing.*
Contradiction	Subject contradicts him/herself, and does not clarify.	I didn't get that much sleep last night. [Interviewer: You tired?] *Yeah. I ain't tired.*
Ambiguous referents	Subject makes reference to something unknown or uncertain.	I worked at Lake Warmog and *that place there.*
Extraneous remark	Subject makes a remark that is not relevant to the task.	(Midinterview) *Whose tape recorder is that?*
Tangential remark	Subject makes a nonsequitur comment or response.	[Interviewer: So you're an animal lover.] Oh, yeah. *And my husband, who's a Capricorn and I'm a Capricorn and we stink together.*
Peculiar language	Subject uses a word or constructs a sentence oddly.	a. I'm a *home wife* now, cause I doesn't work. b. *Just hopefully that I don't* lose no more of my sight.
Reiteration	Subject repeats a phrase perseveratively.	*I got, I got through* it pretty good, *got through, I got through* it good.

[a]Adapted from the criteria of Velligan et al. (1990).

TABLE 3
Interrater Reliabilities for Categories of Language Deviance

Category	Intraclass *r*
Uncompleted remarks	.96
Unintelligible remarks	.77
Contradictions	.32
Ambiguous referents	.76
Extraneous remarks	.76
Tangential responses	.82
Peculiar language	.96
Reiteration	
Total language deviance	.95

some of the distributions not normal. All results reported are two-tailed.

Results

Males did not differ significantly from females on the language measure in any of the groups. Differences between patients' mothers and fathers did not approach significance for levels of language deviance ($p = .89$), distractibility ($p = .60$), or schizotypy ($p = .43$). Therefore, the parents were combined into one group for the analysis.

Language deviance scores. Scores were computed as number of instances of deviance per clause of speech. The forms of deviance most often coded were the following: uncompleted remarks, peculiar language, and unintelligible remarks. Frequencies for the individual categories of deviance in each group are given in Table 3. Distributions of scores within groups are presented in Figure 1.

Language deviance in parents vs. controls. We compared levels of language deviance in the parents with those in the controls, using the Mann Whitney *U* test. We found greater frequencies of deviance in the parents' speech ($U = 12, p = .0002$).[4] We then compared the two groups on each of the specific categories, to assess, in an exploratory way, whether some forms of deviance might be more characteristic of the parents than others. The parents scored numerically higher

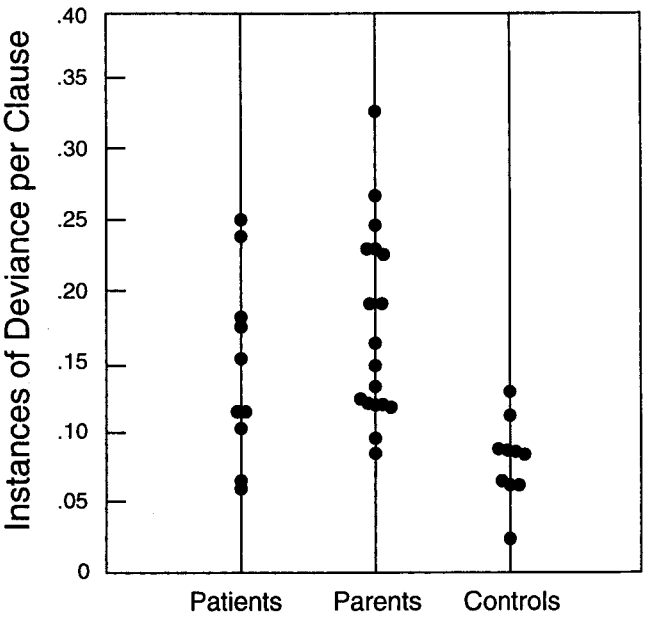

FIG. 1. Distributions of language deviance scores in schizophrenic outpatients, their parents, and nonpsychiatric controls.

[4]There was some question about the appropriateness of considering parents from the same family as independent observations in this comparison. Therefore, as a precaution, we also compared patients' mothers versus controls and patients' fathers versus controls. Both comparisons were significant ($U = 4$, $p = .0005$; and $U = 9$, $p = .003$, respectively).

than the controls on six of the eight categories. On three of these, the parents' mean scores were significantly higher than those of the controls. These included the following: uncompleted remarks ($U = 43$, $p < .05$), unintelligible remarks ($U = 33$, $p < .01$), and ambiguous referents ($U = 32$, $p < .01$).

We also compared these two groups on overall language deviance using a χ^2 test, with a Yates correction for the small sample size, and found that a significantly greater proportion of the patients' parents scored above the median of .124 compared with the control subjects ($\chi^2 = 7.73$, $p < .01$). Thirteen of the 18 parents scored high on the measure, compared with only one of the 10 controls.

Language deviance in parents vs. patients. Parents did not differ significantly from patients on overall language deviance scores ($U = 66$, $p = .25$). A χ^2 analysis showed no difference whatever between these two groups on proportions of subjects scoring above the median of .154. Exactly half of the subjects in each group were high on the measure.

Language deviance and attention. Baseline nondistraction digit-span performance was not associated with language deviance in the parents (rho = −.29, $p = .26$), the patients (rho = −.36, $p = .25$), or the controls (rho = −.38, $p = .25$). Distractibility, as measured by the difference between digit-span performance in the nondistraction versus distraction conditions was significantly positively correlated with levels of language deviance in the parents (rho = .51, $p = .03$) and in the patients (rho = .74, $p = .05$). In the control subjects, there was no such association (rho = −.41, $p = .21$).

Language deviance and schizotypy. Parents did not differ significantly from controls on the schizotypy scale (severity scores: $U = 78$, $p = .58$; statement scores: $U = 69$, $p = .31$). However, schizotypy severity was significantly associated with levels of language deviance in the parents (rho = .51, $p = .03$) but not in the controls, (rho = .34, $p = .30$). It should be noted that the control sample was smaller than the parent sample, and that the range of scores on this scale was more restricted in the control group. Thus, our results do not clearly establish differential relationships between schizotypy and language deviance in the two groups, even though the association was statistically significant for the parents and not for the controls. As predicted, parents' scores on the illusions scale were positively correlated with the language ratings (rho = .49, $p = .04$). We also examined, in an exploratory way, the correlations between the other specific components of the schizotypy scale and language deviance in the parents. Those that were significantly associated with language deviance were social isolation (rho = .54, $p = .03$) and social anxiety (rho = .62, $p = .01$).

Discussion

The parents in our study scored significantly higher than controls on the measures of language deviance, and slightly but nonsignificantly higher than the patients. This pattern of between-group differences is consistent with Singer and Wynne's earlier findings on CD. Because we were assessing conversational speech samples rather than responses to ambiguous visual stimuli, we could not include all the traditional criteria used in rating Rorschach and TAT responses. In particular, the perceptual anomalies that were an important part of the projective criteria were not directly tapped by our measures. Interestingly, however, our language measures in parents were positively associated with experiences of perceptual illusions, as assessed using the separate schizotypy scale. This finding lends support to Singer and Wynne's inclusion of both perceptual and language anomalies in their larger construct, and also supports our belief that we were measuring something akin to CD.

Our sample was small, and therefore statistical power was low. We used nonparametrics so that the results would not be unduly influenced by extreme scores, but these methods also tended to decrease the sensitivity of the comparisons. Despite these factors, parent versus control-group differences on the language measure were large and highly significant. The

TABLE 4
Language Deviance Ratings of Patients, Parents, and Controls[a]

Category	Patients	Parents	Controls
Uncompleted remarks	.037 ± .030	.050 ± .038	.022 ± .011
Unintelligible remarks	.027 ± .026	.027 ± .019	.008 ± .010
Contradictions	.012 ± .011	.013 ± .011	.005 ± .006
Ambiguous referents	.023 ± .018	.025 ± .024	.006 ± .008
Extraneous remarks	0	.001 ± .003	0
Tangential responses	.009 ± .010	.007 ± .009	.008 ± .008
Peculiar language	.038 ± .014	.057 ± .038	.034 ± .017
Reiteration	.004 ± .006	0	.001 ± .002
Total language deviance	.150 ± .067	.179 ± .068	.084 ± .029

[a]Values are $\bar{X}$ ± SD. Ratings are reported as number of occurrences per clause of speech.

speech of the parents was more fragmented, obscure, and amorphous than that of the controls, and their language deviance was related to levels of distractibility and other putative schizotypy markers.

A qualitative examination of the instances of deviance in the parents' speech samples supported Singer and Wynne's contention that they reflect difficulty maintaining a shared focus of attention with another person. Other cognitive processes also appear to underlie these anomalies of speech. Many instances of odd word usage and sentence construction that were coded under the category of peculiar language suggested difficulties with the attainment and maintenance of conventionally defined, socially shared constructs. Remarks scored as contradictions, and examples of peculiar reasoning coded under the heading of unintelligible remarks, both reflected an illogicality consistent with tendencies toward fragmented attention and poor concept definition. The presence of these characteristics in the parents we studied is consistent with earlier findings on parents of poor performance on object-sorting tests (McConaghy, 1959; Rosman et al., 1964) and on the Shipley concept formation test (Phillips et al., 1965).

Another point of interest is that scores on the odd communication component of the schizotypy scale were not associated with language deviance, suggesting that subjects were not always aware of their communicative difficulties. Our subjective impressions were in accord with this interpretation of the data. The deviant speakers in our sample did not appear to be cognizant of the obscurity of their remarks. Rather, they seemed to assume that the interviewer understood their meanings even when they did not provide clear and adequate information. This suggests a limited awareness of the separate perspective of the listener. Poor communicative capacities tend to impair social interaction in general. Lack of awareness of the perspective of others would also predict difficulties in social relationships. These factors could explain, at least in part, the high scores on social anxiety and isolation in those parents with high language deviance ratings. In any case, these latter findings suggest that the communication difficulties are part of a more general social skills deficit in these individuals.

In summary, the parents in our study manifested subclinical communication difficulties in their conversational speech that were positively related to subtle attentional, perceptual, and social impairments. We do not know whether the language deviance in our "unaffected" parents was reflective of a genetically transmitted vulnerability to mental disorder, or a communication style that adversely affected the cognitive development of their offspring, or both. Related to this question is our finding of higher levels of deviance in *both* members of five of the nine parent pairs. A simple genetic model would predict deviance in only one parent of most pairs. An assortative mating hypothesis could be invoked to explain the finding. However, given the evidence that factors other than genes play a part in schizophrenic etiology in at least some cases, we cannot reject the possibility, put forth originally by Singer and Wynne, that communicative deficits of this kind in parents may have a pathogenic environmental impact as well, perhaps especially on genetically vulnerable offspring. If this is so, such an effect presumably would be magnified in families in which both parents showed the deficits. This could explain the high incidence of deviance in the speech of both parents of our schizophrenic samples.

The question of the etiological relevance of CD is still unresolved. It would be useful to study characteristics of the parents of schizophrenic patients on a larger scale. If discriminating characteristics could be fully established and clearly delineated, then, optimally, they could be assessed in adoptive as well as biological parents to determine to what extent they represent genetic versus environmental factors in the etiology of schizophrenia. Failing availability of an adoptive sample, this question could still be addressed to some extent by relating the variables in parents to their family psychiatric histories.

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