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# Children with Schizophrenia-spectrum Disorders: Thought Disorder and Communication Problems in a Family Interactional Context

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Thought disorder and communication patterns during an interactional task were examined in families of children with schizophrenia-spectrum disorders (schizophrenia and schizotypal personality disorder), depressed children, and normal controls. Children with schizophrenia-spectrum disorders showed significantly more thought disorder than their normal peers; levels of thought disorder among depressed children fell between those observed in the other two groups but did not differ significantly from either of them. Similarly, mothers of children with schizophrenia-spectrum disorders showed more thought disorder than mothers of normal control children but did not differ from mothers of depressed children. Children with schizotypal personality disorder did not differ from children with schizophrenia. These findings demonstrate that the thought disorder present in childhood-onset schizophrenia and schizotypal personality disorders is manifest in an important social context, the family.

*Keywords:* Schizophrenia, childhood, communication deviance, thought disorder.

*Abbreviations:* CD: communication deviance; DD: dysthymic disorder; K-SADS-E: Schedule for Affective Disorders and Schizophrenia for School-Aged Children—Epidemiological Version; MDD: major depression; MDD+DD: double depression; SPD: schizotypal personality disorder; TDI: Thought Disorder Index.

## Introduction

Thought disorder has long been considered a fundamental feature of schizophrenic illness (Bleuler, 1950), and numerous studies have shown that adults with schizophrenia are characterized by high levels of thought disorder. Recent research has begun to document that childhood-onset schizophrenia is also associated with thought disorder. Clinical descriptive studies have shown that children with schizophrenia demonstrate more thought disorder than children with autism (Green, Campbell, Hardesty, Grega, & Gayol, 1984; Kolvin, Ounsted, Humphrey, & McNay, 1971; Russell, Bott, & Sammons, 1989; Volkmar, Cohen, Hoshino, Rende, & Rhea, 1988) and children with conduct disorders (Green et al., 1984). Arboleda and Holzman (1985) demonstrated higher levels of thought disorder in a heterogeneous group of psychotic children (including children with schizophrenia) and children at risk for psychosis (based on psychosis in the biological mothers) as compared to normal children and nonpsychotic child psychiatric inpatients. Caplan and colleagues demonstrated that children with schizophrenia-spectrum disorders (schizophrenia and schizotypal personality disorder) can be

distinguished from age-matched normal controls based on illogical thinking and loose association scores on the Kiddie Formal Thought Disorder Scale (Caplan, Guthrie, Fish, Tanguay, & David-Lando, 1979; Caplan, Perdue, Tanguay, & Fish, 1990). Finally, in a preliminary report with an initial subgroup of the present sample, Tompson, Asarnow, Goldstein, and Miklowitz (1990) found that, when compared to children with major depressive disorder, children with schizophrenia-spectrum disorders evidenced higher levels of thought disorder on a family interactional task.

Despite these advances, many questions remain. First, because most studies exploring thought disorder in children have relied on analyses of children's communication during assessment procedures with unfamiliar adults, it remains unclear whether children with schizophrenia will show evidence of thought disorder during interactions with significant others in the natural environment. Second, there is limited evidence supporting the view that children with schizophrenia show more thought disorder than other psychiatric groups, underscoring the need for comparisons between children with schizophrenia and children suffering from nonschizophrenic disorders. Third, although schizotypal personality disorder (SPD) has been conceptualized as falling within the schizophrenia-spectrum, the diagnosis of SPD in childhood is controversial and its outcome and course are not known. Current evidence suggests familial and phenotypic similarities between schizophrenia and SPD

in childhood (Asarnow, 1988), and one study published to date shows similar levels of thought disorder in schizophrenia and SPD children (Caplan et al., 1989, 1990). However, additional research is needed to clarify this issue further.

Although thought disorder has been shown to be a hallmark of schizophrenic illness, communication problems in relatives have also been identified as a robust correlate of adult-onset schizophrenia. However, despite the significance of *parental* communication in children's rearing environments and the numerous studies demonstrating that parents of adults with schizophrenia tend to be characterized by high rates of communication anomalies (Doane, West, Goldstein, Rodnick, & Jones, 1981; Goldstein, 1981; Liem, 1980; Miklowitz & Stackman, 1992), relatively few studies have examined the communicative behavior of parents of children with schizophrenia or SPD. In an initial study, Asarnow, Ben-Meir, and Goldstein (1987) found that parents of children with schizophrenia or SPD showed significantly higher levels of communication deviance while taking a projective test with an examiner (TAT; Jones, 1977) than did parents of depressed children. The communication deviance measure is presumed to index a confusing, unclear communication style that leads to a disruption in the focus of attention with the listener (Singer, Wynne, & Toohey, 1978) and may reflect subclinical forms of thought disorder (Doane, 1985). However, in a preliminary report with a subset of the present sample, Tompson et al. (1990) found that parents of children with schizophrenia or SPD did not differ from parents of children with depression on a measure of disordered communication derived from family interaction. Thus, the extent to which parents of schizophrenia-spectrum children show communication problems cross-situationally and during interactions with their children remains to be determined.

The present study aims to address these issues by comparing communicative behavior and thought disorder among children with schizophrenia-spectrum disorders and their parents, children with depression and their parents, and normal control children and their parents during a family interaction task. Major predictions of this study were as follows:

- (1) Consistent with the hypothesis that children with schizophrenia or SPD would show elevated levels of thought disorder and communication problems, we predicted that children with schizophrenia or SPD would show more communication problems, particularly those reflecting thought disorder, when compared to both depressed children and children with no psychiatric disorder.
- (2) Consistent with the view that SPD falls within the schizophrenia-spectrum, we predicted that children with SPD would be significantly higher than normal control children in their level of thought disorder.
- (3) Based on the hypothesis that childhood-onset schizophrenia and SPD are associated with the adult forms of these disorders, we predicted that, similar to findings with parents of adults, parents of children with schizophrenia or SPD would

show more communication problems than would parents of children with no psychiatric disorder.

## Method

### *Subjects*

The total sample for the study consisted of 56 children and their parents. Children were between 6.9 and 13.43 years of age (mean 10.26). There were 42 boys and 14 girls. The sample consisted of 48 Caucasian children, 3 African-American children, 4 Latino children, and 1 Asian child. At the time of entry into the study, 21 children (38%) were living in two-parent homes and 35 children (62%) were living in single-parent homes. There was a wide range of socioeconomic status level in the sample, as revealed by a mean four-factor Hollingshead (Hollingshead, 1975) rating of 47.3 (range 17–66). Children with depressive disorders and children with schizophrenia-spectrum disorders were recruited from the child psychiatric inpatient service of the UCLA Neuropsychiatric Institute or affiliated hospitals. To be included in the sample each child had to meet the following criteria: 7–14 years of age during the index hospitalization; living with parents prior to hospitalization; WISC-R (Wechsler, 1974) Full Scale IQ above 70; and meeting DSM-III (American Psychiatric Association, 1980) criteria for major depression, dysthymic disorder, schizophrenia, or SPD based on the project diagnostic assessment described later. Twenty-one normal controls were recruited through community announcements, advertisements, and mailings. Following a telephone screening in which parents were asked whether the child had ever had adjustment problems or had been on medication for emotional or behavioral problems, evaluations were conducted using the same diagnostic procedures employed with the psychiatric groups. Two children met criteria for attention deficit disorder on evaluation and were not included in the sample.

Table 1 presents the demographic and diagnostic characteristics of subjects in each group. The 18 children in the depressed group consisted of 8 children with major depression (MDD), 2 children with dysthymic disorder (DD), and 8 children with double depression (MDD+DD; Keller & Shapiro, 1982; major depression superimposed on dysthymic disorder). The 20 children in the schizophrenia-spectrum disorders group included 10 children with schizophrenia and 10 children with SPD. Schizophrenia and SPD were diagnosed using the same DSM-III criteria used with adults. However, for a diagnosis of SPD, a minimum symptom duration of one year was required in order to provide comparability with duration criterion for dysthymic disorder. Hierarchical rules were needed to assign children to primary diagnostic groups. Because the major focus of this report was on the association between thought disorder and schizophrenia-spectrum disorders, when depression (MDD or DD) and SPD co-occurred, children were placed in the schizophrenia-spectrum group. This is also consistent with the DSM-III convention of not diagnosing mood disorder when superimposed on schizophrenic or schizophreniform disorders. Like most child psychiatric samples, comorbidity was found among both psychiatric groups, with the most common codiagnoses being disruptive behavior disorders (attention deficit disorder, conduct disorder, oppositional disorder). The depressed group also had a high rate of anxiety disorders, and the schizophrenia-spectrum group showed high rates of depression (atypical depression or dysthymic disorder).

### *Procedures*

*Intake diagnoses.* DSM-III diagnoses for the psychiatric sample were derived at intake based on the following sources of

information: semi-structured diagnostic interviews using the Schedule for Affective Disorders and Schizophrenia for School-Aged Children–Epidemiological Version (K–SADS–E; Puig-Antich, Orvaschel, Tabrizi, & Chambers, 1983) conducted with each child; K–SADS–E interview with parents; and all other information available on each child, including observations of the child's clinical status during the course of hospitalization and the results of other interviews and evaluations conducted during the course of the child's hospitalization. Given the relative rarity of schizophrenia and SPD in childhood, this sample, composed exclusively of inpatients, was collected over an approximate 7–8-year period. Over the course of the project, there were three primary interviewers and one senior diagnostician. All interviewers were trained to a minimum criterion of greater than 80% agreement using a series of training tapes and co-rated interviews. Inter-rater reliability was assessed regularly in the laboratory throughout the course of the study, and interviewers worked on multiple projects. Two experienced interviewers had to agree on the child's diagnosis for a child to be included in this sample and only children meeting criteria for current episodes of MDD, DD, schizophrenia, or SPD were included. During the course of data collection for this sample, estimates of inter-rater reliability were computed at three time points by comparing ratings for each interviewer with those of the criterion diagnostician (J. Asarnow, Ph.D.). Reliability was excellent for principal diagnosis: (a) time 1,  $\kappa = .82$  based on 27 cases; (b) time 2,  $\kappa = .90$  based on 24 cases; and (c) time 3,  $\kappa = .90$  based on 29 cases. Additionally, the majority of children with schizophrenia or SPD were part of a rigorously and independently diagnosed cohort of children participating in the Clinical Research Center Childhood Psychosis Project (Russell et al., 1989). The control group was evaluated using the K–SADS–E interview, conducted by the third project interviewer (M. Tompson, Ph.D.) with each child's mother.

*Other clinical characteristics of the psychiatric groups.* Ratings of impairment at the time of hospitalization were made using the Children's Global Assessment Scale (C–GAS; Shaffer et al., 1983) and were based on reviews of the child's complete medical records, cumulative school records, and records from prior evaluations and treatment. The C–GAS ranges from 1 to 100 and includes behavioral examples that serve as anchor points. Inter-rater reliability on the C–GAS scores was assessed using intraclass correlation coefficients and ranged from .79 to .99,  $p < .011$ , across three raters.

*Family Consensus Rorschach Task.* The Family Consensus Rorschach Task was given in a session that included all parents and/or partners living in the home and the index child. Each family was taken into an observation room equipped with two video cameras and audiotape equipment. After completing two audiotaped family problem-solving tasks and one teaching task (see Asarnow et al., 1987, for details), a Family Consensus Rorschach Task was presented using the following instructions:

Now we're going to play a little game that many families find to be a lot of fun. This game involves looking at an inkblot together. Discuss it and see how many agreements you can reach about what it looks like, what it reminds you of, and what it resembles. There are no right or wrong answers, of course. You may be reminded of something by the whole inkblot, by a part of it, or perhaps just by something about it. I'm going to give you seven minutes and then I'll return to give you further instructions.

These instructions differ from the original Family Consensus Rorschach Task instructions in that they encourage the family to treat the task as a game. This was intended as a "behavioral challenge" to the depressed children, who by definition have difficulty finding pleasure in activities. The investigator then answered the family's questions, placed Rorschach Card VIII in

the center of the table, and left the room. After 7 minutes elapsed, the investigator re-entered the room and conducted an inquiry to establish the exact location of each percept on the Rorschach card. The family members were then thanked for their participation.

Each of the audiotapes was transcribed and verified against videotapes of the task. Instances of nonverbal behavior exhibited by family members, such as walking about the room, standing up, humming loudly, laughing, and making faces at the camera, were noted on the transcripts.

*Interactional coding scheme.* The disordered communication coding scheme (Tompson et al., 1990) was designed to tap three previously mentioned types of communication problems: (a) behavior reflective of "attentional drift," (b) problems with clarity of communication and commitment to ideas, and (c) speech indicative of thought disorder. Construction of the coding system involved several steps.

First, all codes were originally drawn from the Doane and Singer (1977) communication deviance (CD) scoring manual for the Family Consensus Rorschach. These codes were then compared with all codes in the Thought Disorder Index (TDI; Johnston & Holzman, 1979; Solovay et al., 1986). When CD codes and TDI codes were highly similar (for example, contaminations), the definitions were augmented to include behavioral examples from both coding systems. This was done because it was believed that the CD codes might pick up the more minor forms of communication disturbance that the parents might display but that additional criteria were required to tap the more blatant forms of disordered thinking the children might show. An additional code, "non-acknowledgement," was added because it was believed that lack of acknowledgement disrupts clear communication. Some CD codes that were similar in content were combined, and some names were changed to reflect more clearly the content of the codes. It is important to note that the coding system was based on two coding systems that have demonstrated validity with adults and, to a lesser extent, with children.

Second, codes were grouped into the three major categories of disordered communication. All codes, including definitions and examples, were typed on 5" × 8" notecards. Two researchers (Asarnow and Goldstein) with knowledge of the CD coding system and with extensive experience with thought-disordered, psychotic patients then sorted the cards into the following mutually exclusive categories:

(1) *Attentional drift.* These codes are used to implicate behavior that blatantly detracts attention from the flow of the task. Although many types of verbalizations may make it more difficult for the task to proceed and for family members to maintain a shared focus of attention, these particular behaviors are more obvious to the casual observer. Both verbal and nonverbal behaviors are coded here.

(2) *Clarity of communication.* These codes reflect a lack of clarity in two different ways: (a) whether or not the speaker has asserted a percept (thus codes in this category are applied when the listener is unsure if the speaker is asserting a percept, owning their assertion, or retaining that assertion), and (b) whether a percept that has been asserted has been accepted or acknowledged by another family member. In these instances, a family member responds to the speaker in such a way that the speaker wonders if their percept has been heard, acknowledged, or accepted. The essential aspect of these clarity codes is that, due to lack of commitment or to vagueness, the speaker's position on a percept is unclear.

(3) *Thought disorder.* These codes reflect a dimension from low to high levels of disordered thinking. Although some codes in this category may be more clinically indicative of thought disorder than other more mild codes, in this scheme all codes are weighted equally. Note that this is a variation from the TDI (Solovay et al., 1986), where weights are used to reflect severity.

Both an inability to organize ideas and an inability to organize basic speech are captured in this category.

The two raters agreed on the assignment of 70 % of the codes.

Finally, the first three authors then came to consensus on those items on which there had been disagreement. Based on these procedures, each code was assigned to one of the three major categories of the disordered communication scoring system. Additionally five transcripts were reviewed and one code that did not occur was excluded from the scheme. *Attentional drift* included such codes as interruptions, extraneous questions/remarks, and nonverbal disruptive behavior. *Lack of clarity* codes included responses in the negative form (saying what the card doesn't look like), retractions and denials, hopping around among responses, and nonacknowledgment. Incompatible alternatives, clanging, contaminations, and peculiar logic are examples of *thought disorder*. Tompson et al. (1990) provides a full description and examples of each individual code.

**Coding Procedure.** More severe types of communication problems have a more disruptive impact on transactional processes. Therefore, for those utterances that could be assigned two codes, the following hierarchical rules were established to ensure that only the coding category reflecting the higher level of severity was assigned: (a) Clarity codes, showing a higher level of disturbance, took precedence over attentional drift codes, and (b) Thought disorder codes, reflecting the highest level of disordered speech, took precedence over both clarity codes and attentional drift codes.

Coding of the family Rorschach protocols was conducted throughout the study by one independent rater who was blind to all patient information other than sex and race (which were obvious from the videotapes). Reliability was assessed on a set of 10 transcripts, which were coded by an additional rater. Kappa statistics were computed for each code (present vs. absent), and adequate reliability was obtained for attentional drift ( $\kappa = .80, p < .001$ ), clarity ( $\kappa = .72, p < .001$ ), and thought disorder ( $\kappa = .85, p < .001$ ). Reliability was established on the content codes, and separate reliability coefficients for each speaker (i.e. mother, child) are not available.

## Results

### Overview and Preliminary Analyses

Preliminary analyses were conducted to evaluate differences between the diagnostic groups on potential extraneous variables. Although all groups had scores on demographic variables, only the two psychiatric groups had scores on the WISC-R IQ measures, C-GAS scale, duration of hospitalization, and number of codiagnoses. Therefore, comparisons on these variables included the depressed and schizophrenia-spectrum groups only. Continuous variables, including age, socioeconomic status, WISC-R Verbal IQ, Performance IQ, and Full Scale IQ, and duration of hospitalization, were compared across groups using one-way analyses of variance (ANOVA) with diagnosis as the between-subjects variable. Where necessary, *t*-tests were conducted to clarify the nature of significant differences. Categorical variables, including sex, ethnicity, family composition, and number of codiagnoses were analyzed using Chi-square tests. As expected, children with schizophrenia-spectrum disorders were more impaired than children with depressive disorders on the C-GAS (Asarnow, Tompson, & Goldstein, 1995); however, the three diagnostic groups did not differ significantly on any of the other examined

variables. Similarly, children with SPD did not differ from children with schizophrenia on any of these variables. Demographic and illness-related characteristics are displayed in Table 1.

Correlations and Chi-square tests were also conducted to examine associations between the dependent variables and the demographic variables. Because the distributions for each category of the communication measure were significantly skewed, the data were ranked for all statistical comparisons. There was a marginal association between child age and child thought disorder ( $r = -0.23; p < .10$ ). Further analyses, however, indicated that age was significantly correlated with thought disorder for children in the schizophrenia-spectrum group ( $r = -0.52, p < .02$ ), but not for the children with depression ( $r = -0.06, n.s.$ ) nor for the normal control children ( $r = 0.31, n.s.$ ).

A priori predictions regarding specific hypotheses were tested using univariate ANOVAs. Number of utterances was positively associated with attentional drift for children ( $r = 0.54, p < .001$ ), mothers ( $r = 0.45, p < .001$ ), and fathers ( $r = 0.79, p < .0001$ ). Additionally, number of utterances varied across diagnostic groups: (a) children in the normal control group spoke significantly more ( $M = 54.44$ ) than children with depression [ $M = 42.11; F(1,34) = 6.63; p < .05$ ] or children in the schizophrenia-spectrum group [ $M = 41.75; F(1,36) = 10.27; p < .01$ ]; (b) mothers of normal control children spoke more utterances ( $M = 54.22$ ) than both mothers of children with depression [ $M = 41.94; F(1,34) = 6.13; p < .05$ ] and mothers of children with schizophrenia-spectrum disorders [ $M = 41.35; F(1,36) = 10.14; p < .01$ ]; and (c) fathers of normal control children spoke more utterances ( $M = 47.67$ ) than the fathers of children with depression [ $M = 26.13; F(1,18) = 13.52; p < .01$ ]. Thus, number of utterances was entered as a covariate in these analyses to control for differences in verbosity. In addition, to further clarify any contributions of IQ, socioeconomic status, or C-GAS to the group differences on the communication variables, separate ANCOVAs were conducted to control for the effects of these variables. However, these covariates yielded no significant effects. Data for children, mothers, and fathers were examined separately. Data are displayed in Table 2.

### Thought Disorder and Communication in Children

The univariate test of an association between thought disorder and the presence of a schizophrenia-spectrum disorder showed a significantly higher rate of thought disorder among children with schizophrenia-spectrum disorders compared to children in the normal control group [ $F(1,35) = 8.29, p < .007$ ]. Rates of thought disorder for children in the depressed group fell between the other two groups, but did not differ significantly from rates of thought disorder for either the normal control or schizophrenia-spectrum groups. No significant differences emerged between diagnostic groups on the attentional drift or communication clarity measures.

### Thought Disorder and Communication in Parents

Univariate tests of the a priori predictions revealed that

Table 1  
*Demographic Characteristics of the Sample*

	Schizophrenic ( <i>N</i> = 20)	Depressed ( <i>N</i> = 18)	Normal ( <i>N</i> = 18)
Age ( <i>SD</i> )	9.97 (1.97)	10.89 (1.54)	9.97 (1.67)
Ethnicity			
Caucasian	17 (85 %)	16 (89 %)	15 (83.5 %)
African-American	2 (10 %)	2 (11 %)	1 (5.5 %)
Other	1 (5 %)	—	2 (11 %)
Gender			
Male	16 (80 %)	14 (78 %)	12 (67 %)
Female	4 (20 %)	4 (22 %)	6 (33 %)
Family socioeconomic status <sup>a</sup> ( <i>SD</i> )	43.75 (13.37)	46.55 (12.96)	50.44 (12.21)
Highest GAS in last year* ( <i>SD</i> )	62.15 (11.43)	70.78 (8.44)	N/A <sup>b</sup> —
Lowest GAS in last year* ( <i>SD</i> )	33.30 (6.28)	39.50 (8.81)	N/A —
Performance IQ ( <i>SD</i> )	97.15 (14.91)	104.00 (15.88)	N/A —
Verbal IQ ( <i>SD</i> )	100.80 (15.64)	104.61 (16.49)	N/A —
Full IQ ( <i>SD</i> )	99.10 (15.36)	105.61 (16.83)	N/A —
Hospital duration in days ( <i>SD</i> )	105.60 (35.79)	95.31 (56.28)	N/A —
Comorbid diagnoses			
Disruptive behavior	13 (65 %)	7 (39 %)	N/A
Anxiety	4 (20 %)	6 (33 %)	N/A
Atypical depression	10 (50 %)	N/A	N/A

<sup>a</sup> Hollingshead (1975).

<sup>b</sup> N/A: not available or not applicable.

\*  $p < .05$ .

Table 2  
*Mean Scores on Each of the Communication Variables for Children and Mothers in the Three Diagnostic Groups (SD in Parentheses)*

	Diagnosis of child		
	Schizophrenia-spectrum	Depressed	No diagnosis
Child	<i>N</i> = 20	<i>N</i> = 18	<i>N</i> = 18
Thought disorder	5.00 (5.07) <sup>a</sup>	3.22 (2.90) <sup>ab</sup>	2.00 (1.78) <sup>b</sup>
Clarity	1.90 (2.13)	2.17 (2.09)	1.30 (1.28)
Attention drift	6.40 (3.80)	5.44 (4.48)	7.40 (4.18)
Mother	<i>N</i> = 20	<i>N</i> = 18	<i>N</i> = 18
Thought disorder	1.85 (1.39) <sup>a</sup>	1.77 (1.90) <sup>ab</sup>	1.00 (1.33) <sup>b</sup>
Clarity	2.50 (1.96) <sup>a</sup>	2.56 (2.64) <sup>ab</sup>	1.61 (1.94) <sup>b</sup>
Attention drift	2.90 (2.35) <sup>a</sup>	3.56 (3.67) <sup>ab</sup>	6.94 (4.35) <sup>b</sup>

<sup>a, b</sup> Groups with different superscripts differ significantly ( $p < .05$ ).

For the purpose of analyses scores were ranked.

(a) mothers of children with schizophrenia-spectrum disorders showed significantly more thought disorder than mothers of children in the normal control group [ $F(1,35) = 6.39, p < .05$ ] but did not differ from mothers of children with depression; (b) mothers of children in the schizophrenia-spectrum group showed *less* attentional drift than mothers of children in the normal control group [ $F(1,35) = 4.88, p < .05$ ] but did not differ from

mothers of children with depression; (c) mothers of children in the schizophrenia-spectrum group displayed more difficulties in communication clarity than mothers of normal control children [ $F(1,35) = 4.82, p < .05$ ] but did not differ from mothers of children with depression. Comparisons of mothers of children with depression and mothers of children in the normal control group further indicated (a) a trend toward less attentional drift among

mothers of children with depression [ $F(1,33) = 3.74, p < .06$ ] and (b) a trend toward more difficulties in communication clarity among mothers of children with depression [ $F(1,33) = 3.23, p < .09$ ]. There were no other significant differences between groups.

Analyses of fathers' data yielded nonsignificant effects. However, the small sample of fathers limits the power of these tests.

### *Relationship between Child and Parent Communication*

To examine the association between child and parent communication, correlations were conducted between the three communication variables for children and each parent. There were notable correlations between the total number of utterances produced by children and the total number of utterances produced both by mothers ( $r = 0.86, p < .0001$ ) and by fathers ( $r = 0.50, p < .006$ ). Therefore, partial correlations were computed between the child and parent communication variables, removing the effects of the correlation between number of child and number of parent utterances and yielding more accurate estimates of the association between child and parent communication.

Significant partial correlations were found for mother and child thought disorder ( $r = 0.32, p < .05$ ) and lack of clarity ( $r = 0.46, p < .001$ ), and marginally for attentional drift ( $r = 0.24, p < .10$ ). Fathers and children were not correlated on any of the communication variables.

### *Comparison of Children with Schizophrenia and SPD*

Consistent with the notion that SPD falls within the schizophrenia-spectrum among children, scores for the schizophrenia and SPD groups were similar, with no significant differences identified for any of the child or parent variables. Indeed, comparisons between the SPD and normal control group revealed that SPD children showed significantly higher rates of thought disorder, and their mothers showed higher levels of thought disorder and clarity problems and lower levels of attentional drift.

### *Within-group Analyses among Children with Schizophrenia-spectrum Disorders*

In order to examine further any heterogeneity among children with schizophrenia-spectrum disorders, associations between the communication variables and the following variables were evaluated: C-GAS scores indexing the severity of the child's impairment; presence vs. absence of a comorbid externalizing disorder (Attention Deficit Disorder, Oppositional Defiant Disorder, and Conduct Disorder); presence vs. absence of a comorbid depressive disorder (atypical depression or dysthymic disorder); age; gender; family composition; socioeconomic status; and WISC-R IQ. Groups were stratified on dimensional variables (C-GAS score, age, socioeconomic status, and WISC-R IQ) using a median split. Examined variables were then entered as independent variables in separate ANOVAs with attentional

drift, clarity of communication, and thought disorder as dependent variables and number of utterances entered as a covariate.

Significant associations were found between the communication variables and two illness-related characteristics:

- (1) Among children with schizophrenia-spectrum disorders the presence of a comorbid externalizing disorder was associated with higher rates of unclear communication [ $M = 2.62, N = 13$  vs.  $M = 0.57, N = 7$ ;  $F(1,18) = 10.42; p < .005$ ].
- (2) Similar to their children, mothers of children with schizophrenia-spectrum disorders plus comorbid externalizing disorders showed more instances of unclear communication than mothers of children with schizophrenia-spectrum disorders without comorbid externalizing disorder [ $M = 3.23$  vs.  $M = 1.14$ ;  $F(1,18) = 7.20, p < .02$ ].

No other significant associations were found.

### *Within-group Analyses among Children with Depressive Disorders*

Within-group analyses among children with depression were conducted using the procedures described earlier, with a few exceptions due to differences in comorbid diagnoses between the two groups. First, comparisons were made between MDD children and children with double depression (MDD + DD). Second, comparisons were made between children with depression with and without a comorbid anxiety disorder (phobias, over-anxious disorder, separation anxiety disorder, and obsessive-compulsive disorder).

Significant associations were found between the communication variables and one demographic variable: children with WISC-R scores of 103 ( $N = 10$ ) or better had higher levels of thought disorder in the interactions ( $M = 4.70$ ) than children with WISC-R scores below 103 [ $N = 8$ ;  $M = 1.38$ ;  $F(2,15) = 6.96, p < .01$ ]. No other significant associations were observed.

## **Discussion**

Major findings of this study were as follows:

- (1) Children with schizophrenia-spectrum disorders demonstrated the highest levels of thought disorder, children with major depression exhibited somewhat less thought disorder, and normal control children showed the lowest levels of thought disorder as defined in this study.
- (2) Children with schizophrenia and SPD were similar on the thought disorder and communication measures.
- (3) Mothers of children with schizophrenia-spectrum disorders showed more thought disorder and difficulties with communication clarity than mothers of normal control subjects, but they did not differ from mothers of children with depression.



- (4) Mothers of normal control children showed more attentional drift than mothers of children in the schizophrenia-spectrum and depressed groups.
- (5) Children displaying high levels of thought disorder and unclear communication tended to have mothers with high levels of thought disorder and unclear communication as defined in this study.

Similar to findings with adult schizophrenia, the present results indicate that thought disorder is a feature of childhood-onset schizophrenia and SPD, and it distinguishes children with schizophrenia-spectrum disorders from their normal peers. It is important to note that these children were diagnosed using DSM-III criteria, which differ from newer systems in a number of ways, for example requiring a shorter duration of symptoms, only one major symptom of psychosis, and deterioration from a previous level of functioning. Although thought disorder is one of the diagnostic criteria for schizophrenia, the children with schizophrenia in this study were all diagnosed based on the presence of prominent auditory/visual hallucinations and/or delusions. Yet disturbances in thinking are apparent in these children, not only in individual testing settings with an experienced examiner, but also in interactions with natural caregivers. These results, in conjunction with findings of a significant association between thought disorder in the children and their mothers, underscore the likelihood that the thought disorder displayed by children with schizophrenia-spectrum disorders may impact on their daily socialization experiences.

Although these findings emphasize differences between children with schizophrenia-spectrum disorders and children without psychiatric disorders, they also underscore the heterogeneity among children with schizophrenia-spectrum disorders and depression. Contrary to preliminary findings with a subsample of the present study (Tompson et al., 1990), children with schizophrenia-spectrum disorders and children with depression did not differ significantly in their thought disorder scores. Although thought disorder scores for the schizophrenia group were somewhat higher than those for the depressed group, the expanded depressed sample included here displayed more thought disorder than the previous subsample, and indeed, there was substantial variation in the thought disorder scores of children in both psychiatric groups. With the exception of our finding that thought disorder scores were somewhat higher among children with depression with higher IQ scores, this heterogeneity could not be explained by the variables examined in our within-group analyses. Thus our findings suggest that, although thought disorder is a frequent characteristic of children with schizophrenia-spectrum disorders, it is a symptom that does not fall completely along diagnostic lines.

It is important to view our finding of heterogeneous levels of thought disorder within our psychiatric groups within the context of clinical studies of childhood-onset schizophrenia, which vary in the proportion of children reported to demonstrate thought disorder, ranging from 40% (Russell et al., 1989) to 100% (Green et al., 1992). Similarly, a proportion of children with depression are at particular risk for developing bipolar disorder, a di-

agnostic entity characterized by high rates of disordered thinking and communication problems (Andreasen, 1979a, b; Werry, McClellan, & Chard, 1991). Indeed, in a recent prospective study of children with major depression, Kovacs and Gatsonis (1989) found that 25% developed bipolarity in adolescence. Hospitalized children with depression, such as those included in the study, demonstrate particularly severe symptoms and may be at heightened risk. Further specification of subtypes of both disorders in childhood may shed light on this issue.

Our findings also bear on the issue of the boundaries of the schizophrenia-spectrum in childhood. Whereas early work (1950–1970) in childhood psychoses grouped all psychotic disorders together, the ICD-9 and DSM-III emphasized distinctions between autism, adult-type schizophrenia in childhood, and other psychoses. In contrast to studies showing clear differences between children with autism and schizophrenia on a wide range of variables, including symptom profiles, intellectual functioning, family history, and likelihood of prenatal and perinatal complications (Green et al., 1984; Kolvin et al., 1971; Volkmar, Cohen, Hoshino, Rende, & Rhea, 1988), our finding of similar thought disorder scores for children with schizophrenia and those with SPD emphasizes the similarity in interactional behavior between these two groups. This lends increasing volume to the body of literature indicating that childhood-onset SPD is appropriately viewed as part of a broader schizophrenia-spectrum.

As predicted, mothers of children with schizophrenia and SPD showed the highest levels of thought disorder and difficulties in communication clarity. This is consistent with literature indicating that parents of adults with schizophrenia demonstrate more communication anomalies in their verbalizations than parents of non-schizophrenic adults (for reviews see Liem, 1980; Miklowitz & Stackman, 1992). Our finding that parents of children with schizophrenia-spectrum disorders and parents of children with depression did not differ significantly in thought disorder and communication disturbances is also consistent with recent reviews indicating that communication anomalies may not be specific to parents of schizophrenics, but may “increase monotonically with the severity of offspring disturbance” (Miklowitz & Stackman, 1992). Future work is needed to clarify whether the communication disturbances identified in this study are associated with the presence of schizophrenia-spectrum disorders in parents, represent subclinical levels of symptomatology, or have some other explanation.

In this context it is important to note that the present findings do not indicate whether the direction of effects is from child to parent or from parent to child. Additionally, the significance of the elevated levels of thought disorder observed in parents of children with schizophrenia-spectrum disorders remains unclear. For example, the thought disorder observed in these parents may reflect a subclinical manifestation of genetic risk for the disorder, a reaction to the stress of coping with the disordered communication of children with schizophrenia or SPD, or some other factor.

Among children with schizophrenia-spectrum disorders, the presence of a comorbid externalizing disorder



appears to signal additional communication problems within the family, specifically, less clear communication patterns. It may be that interactions with children exhibiting both schizophrenia-spectrum disorders and disruptive behavior disorders are more stressful, leading to decreased communication clarity. Further research is needed to clarify this issue.

Interestingly, mothers of normal control children showed the highest levels of attentional drift. These mothers shifted topics more, interrupted more, and made more offhand comments. However, in reviewing these videotapes it seemed that the family interactions of the normal control children were characterized by more relaxed "give and take." Families seemed easily able to depart from the task temporarily and then return to it quickly. They used more humor and seemed to enjoy the interactions. Thus, the higher rate of attentional drift shown by mothers in this group may reflect spontaneity and flexibility rather than a problem with focusing attention on the task. The finding that the normal controls and both their mothers and fathers spoke more on the task is also suggestive of a more relaxed and spontaneous interactional style in these families.

It is important to note that children in both the schizophrenia-spectrum and depressed groups were hospitalized at the time of the assessments. Consequently, results may not generalize to less severely affected children, and family interactions during this high stress period may not be reflective of behavior at other times. The large number of single-parent families and the smaller sample of fathers limited our analyses of the role of father and of more complex models of family interaction. Our data suggested no differences in thought disorder or communication problems between fathers in the three groups. Indeed, levels of thought disorder were slightly lower among the fathers in the schizophrenia-spectrum versus other groups. There may be a number of reasons that differences were noted for mothers and not fathers. First, mothers of children with mental disorders may be more affected by disordered child communication, given the generally higher degree of mother-child contact. Second, the fathers in our sample, particularly in the schizophrenia-spectrum group, spoke much less than mothers, and the quantity of their speech covaried with diagnosis, limiting our ability to examine communication difficulties and thought disorder among fathers. Future studies are needed to examine more closely the role of paternal communication on family interaction patterns.

In conclusion, thought disorder has been viewed as a key feature of schizophrenia. Results of the present study clearly document that thought disorder is seen in children with schizophrenia-spectrum disorders, distinguishing them from their normal counterparts. Moreover, it is manifest in an important social context, the family. Further research areas investigating the development of these communication difficulties, their impact on family life, and their modifiability are important future directions.

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