

Language comprehension and communicability in schizophrenics and their mothers. 'Cloze analysis' as a measure of verbal communication

Marek Nieznański

From the Department of Clinical Psychology, University of Cardinal Stefan Wyszyński, Warsaw
Head: Prof. A. Jakubik, M.D. (hab.)

The paper presents the results of assessing the ability to transmit and receive information in schizophrenics and their mothers.

Key words: communication, schizophrenia

General systems theory and information theory were of great importance for the development of contemporary psychology and psychiatry. Among other things they inspired new models of cognition, language and communication in schizophrenia. Dysfunctions at different stages of information processing started to be perceived not as separated but linked through the positive or negative feedback mechanisms [2, 8]. In this line of research several investigations have been made into the redundancy of schizophrenic language using 'Cloze' procedure. These studies found schizophrenics less communicable, especially when they were thought-disordered [10, 11, 12, 14, 15, 18, 19, 20]. They were also less efficient on tasks requiring the use of clues provided by the context [12, 21]. According to information theory, redundancy in a language is a safety margin for the understanding of speech. Thanks to redundancy the receiver can estimate the meaning of the missing part of the message [10]. In this study some language manifestations of disturbed cognition and communication were assessed not only in schizophrenics but also in their mothers.

Method

Cloze procedure

Cloze procedure, first described by Taylor [24], is an empirical measure of the ease with which a listener can comprehend a speech sample. By the Cloze analysis we can obtain an estimate of predictability (redundancy) of someone's language. In other words, it is the assessment of the sender's ability to transmit information. In order to

communicate, the sender must encode the message so that the receiver can interpret it without an error.

To obtain speech samples, subjects were asked to describe up to three TAT Cards (18 GF, 6 BM, 4). When it was necessary, the researcher provided only minimal prompts to facilitate discourse. The speech samples were transcribed and, according to Cloze procedure, every fourth word was omitted.

One hundred and forty five psychology students served as Cloze judges. They were given copies of two texts and asked to fill in the blanks. They were urged to complete every blank and were given as much time as they needed. Each referee obtained texts from the experimental group and the control one. Students did not know who wrote the texts.

For each speech sample the proportion of correctly filled blanks was computed. The criterion for scoring was a perfect match with the word in the original text. If a synonym was supplied, it was also scored as a correct response.

Reverse Cloze

The second measure was the reverse Cloze [12]. In this task, the subjects were asked to guess the missing words in the text they were given. The text was chosen in a pilot study from five speech samples. Its language was coherent and cohesive. The text was a description of the TAT Card (13 B) made by a philologist. It contained only several items that could be very hard or trivial for the subjects to guess. The passage consisted of 216 words, every fourth word had been deleted and replaced by a blank, all punctuation was omitted. At the beginning, one sentence was left intact. The text contained 50 blanks. There was no time limit but most subjects needed twenty to thirty minutes to perform the task. Each insertion was classified among one of the following categories:

1. Identical or synonymous with the original word;
2. Different but acceptable;
3. Unacceptable or lack of insertion.

The author performed the assessment. If the classification was not obvious, a philologist or a professor of logic was asked for advice. The insertions that were different from the original, but did not disturb the cohesion of the text were recognised as acceptable. Only those responses, which did not make sense at all, were classified as unacceptable. They either contained syntactically inadmissible words or seemed semantically incongruous with the context [25].

Reverse Cloze is a measure of language comprehension and, to a certain extent, of the ability to use contextual clues, to gain from redundancy. Otherwise, it is a measure of the decoding process efficiency.

Subjects

In this study 14 patients and 15 mothers of schizophrenics were examined. The qualifying criteria for patients included a diagnosis of paranoid schizophrenia made

by an experienced psychiatrist, and no history of brain damage or drug/alcohol dependence. All patients gave their consent.

Mothers of patients were recruited through psychiatric wards where their son or daughter was an inpatient. If the patient did not oppose, a telephone call was made and an appointment with his mother was arranged for testing. The main criteria for qualification were: 1) no history of psychiatric treatment, 2) son or daughter having a diagnosis of schizophrenia, established by psychiatrists, and, of course, 3) willingness to participate.

Participants from control groups were precisely paired with subjects from experimental groups by age, education and score on vocabulary of the Wechsler Adult Intelligence Scale - Revised (WAIS-R). Subjects from both control groups had no history of mental disease in their families.

Vocabulary subtest of WAIS-R was used as an estimate of general verbal intellectual abilities. Subjects from experimental and control groups were matched on the level of general verbal intelligence, education and age to ascertain that group differences in Cloze scores were not attributable to differences in these variables. Table 1 lists the demographic data for the experimental and control groups.

Table 1

Demographic characteristics of subjects

Variables	Experimental groups		Control groups	
	mothers n=15	patients n=14	mothers n=15	offspring n=14
	mean (s.d.)		mean (s.d.)	
Age (years)	55.8 (9.7)	28.1 (10.3)	53.5 (10.1)	30.6 (13.3)
Sex: women / men	15 / 0	6 / 8	15 / 0	6 / 8
WAIS-R vocabulary (raw score)	28.3 (11.6)	33.1 (13.7)	28.3 (10.8)	32.4 (14.2)
Level of education: elementary	1	1	1	3
technical	0	2	0	1
secondary	8	10	8	7
semi-higher	1	0	1	1
university	5	1	5	2

Results

Traditional Cloze results

The mean proportion of correctly filled blanks in samples of patients' speech was significantly lower than that obtained by healthy controls. Communicability, as measured by the Cloze procedure, did not distinguish between mothers of schizophrenics and mothers of healthy persons. Although mothers of schizophrenics were less predictable than were mothers of controls, the difference was not statistically significant. The means, standard deviations and ranges for the Cloze scores are presented in Table 2. Raw scores are proportions of correctly guessed words in the subject's text.

Table 2

Traditional Cloze scores (proportion of correct responses)

Group	Mean (s.d.) min.-max.	Uilowon test
Mothers experimental group	0.424 (0.116) 0.261-0.671	15 total pairs $p = 0.28$
control group	0.475 (0.09) 0.371-0.655	(ns)
Offspring		14 total pairs
experimental group	0.452 (0.109) 0.152-0.629	$p < 0.02$
control group	0.545 (0.108) 0.352-0.793	

Reverse Cloze results

Comparison for subjects from the experimental and control groups resulted in a significant difference in categories of insertions. Table 3 indicates that the patients and mothers of schizophrenics had a significantly higher mean proportion of unacceptable and lacking insertions and a lower level of identical or synonymous insertions than the subjects from control groups had.

Table 3

Reverse Cloze scores (number of responses)

Category of insertion	Mothers			Offspring		
	Experimental group	Control group	Uilowon test	Experimental group	Control group	Uilowon test
Identical or synonymous mean (s.d.) min.-max.	27.3 (9.97) 7-45	32.9 (6.14) 14-39	15 pairs $p < 0.02$	24.7 (9.80) 2-38	36.3 (6.99) 20-45	14 pairs $p < 0.003$
Unacceptable or lack mean (s.d.) min.-max.	16.3 (9.52) 2-34	7.6 (5.66) 2-23	$p < 0.003$	17.5 (11.69) 3-47	6.0 (6.26) 0-22	$p < 0.003$

Discussion

It was confirmed that Cloze procedure is a useful measure for differentiating schizophrenic speech from the speech of healthy persons. The reduction of ability to use contextual clues appeared to be characteristic of patients. Though it is not yet precisely identified which cognitive functions determine Cloze performance, application of both kinds of this method (traditional and reverse) can describe input and output

dysfunctions in communication. The results suggest that schizophrenic patients demonstrate deficits both in the ability to transmit information and to receive it.

To the best of my knowledge, this is the first assessment of verbal communication in mothers of schizophrenics using Cloze analysis. The study indicates that the main deficit in mothers of schizophrenics concerns acquisition of information. They made significantly more incorrect predictions in the text than mothers of healthy controls did.

These deficits could affect social functioning of schizophrenics and their mothers, especially their family interactions. Communication between mother and her ill son or daughter must be very difficult when mother needs a higher level of redundancy to comprehend well and her offspring's speech is less predictable than normal language is.

These assumptions are in accord with studies demonstrating cognitive impairments in parents of schizophrenics and deviations in communication in their families. For example, L. Wichström and A. Holte [7, 26, 27] measured feedback mechanism in communication acts, and found disconfirmatory communication specific to families of schizophrenics. In a series of studies, M. T. Singer and L. C. Wynne developed a construct of communication deviance to characterise these families' interactions [9, 22, 23]. In other studies parents of schizophrenics manifested higher frequency of unclear linguistic references in the speech samples than controls [3, 4, 5].

The findings of many studies provide substantial evidence that the non-schizophrenic parents of schizophrenic patients as a group also demonstrate subtle cognitive difficulties [16, 17].

The data from this and other studies raise an unsolved question of aetiology of deficits detected in schizophrenics. One possibility is that these impairments are the vulnerability factors for schizophrenia that are genetically transmitted within family. Another line of interpretation suggests that mutual influences during family interaction may contribute to the deficits in information processing and communication. Finally, the detected disturbances may be an effect of a family burden, the stress involved in having mentally disturbed offspring [1, 6, 13, 22].

It is interesting that the groups of mothers did not differ significantly with respect to communicability. It is surprising that language impairments were manifested only in acquisition but not in transmission of information. Production of speech may be not disturbed or disturbed only in a small way. The question whether our failure to find lower predictability is associated with methodological limitations of this study, requires further investigation. One possibility is that speech samples used here in the traditional Cloze were too short.

This study has got some shortcomings that should be eliminated in further research. Firstly, the sample size was relatively small. Moreover, the diagnoses of patients need to be confirmed by a standardised interview, also all assessments should be made in a fully blinded fashion. In spite of these difficulties the study provides a good schema for analysing communication disturbances on the basis of information theory. In future investigations it would be interesting to examine father's communication abilities and to find family patterns of information circulation. Increased attention should also be

directed toward links between manifestations of expressed emotions and verbal communication examined using Cloze analysis. Criticism or overinvolvement may be reactions to frustration of the need to understand each other during day-to-day family interactions. I believe this to be a fruitful area for future research.

References

1. Bateson G, Jackson DD, Haley J, Weakland J. *Towards a theory of schizophrenia*. Beh. Science 1956; 1: 251-264.
2. Bertalanffy L Von. *General systems theory and psychiatry. An overview*. In: W Gray, FJ Duhl, ND Rizzo, eds. *General systems theory and psychiatry*. Boston: Little Brown Co.; 1969.
3. Docherty NM. *Communication deviance, attention, and schizotypy in parents of schizophrenic patients*. J. Nerv. Ment. Dis. 1993; 181: 750-756.
4. Docherty NM. *Cognitive characteristics of the parents of schizophrenic patients*. J. Nerv. Ment. Dis. 1994; 182: 443-451.
5. Docherty NM, Sledge WH, Wexler BE. *Affective reactivity of language in stable schizophrenic outpatients and their parents*. J. Nerv. Ment. Dis. 1994; 182: 313-318.
6. Green MF. *Cognitive remediation in schizophrenia: Is it time yet?* Am. J. Psychiatry 1993; 150: 178-187.
7. Holte A, Wichström L. *Confirmatory and disconfirmatory feedback in families of schizophrenics, pathological controls and normals*. Acta Psychiatr. Scand. 1990; 81: 477-482.
8. Jakubik A. *Zaburzenia osobowości. [Personality Disorders]*. Warszawa: PZWL; 1997.
9. Liem JH. *Family studies of schizophrenia: an update and commentary*. Schizophr. Bull. 1980; 6: 429-455.
10. Maher B. *The language of schizophrenia: a review and interpretation*. Brit. J. Psychiatry 1972; 120: 3-17.
11. Manschreck TC, Maher BA, Rucklos ME, White MT. *The predictability of thought disordered speech in schizophrenic patients*. Brit. J. Psychiatry 1979; 134: 595-601.
12. Newby D. *'Cloze' procedure refined and modified. 'Modified Cloze', 'reverse Cloze' and the use of predictability as a measure of communication problems in psychosis*. Brit. J. Psychiatry 1998; 172: 136-141.
13. Nuechterlein KH, Goldstein MJ, Ventura J, Dawson ME, Doane JA. *Patient – environment relationships in schizophrenia. Information processing, communication deviance, autonomic arousal, and stressful life events*. Brit. J. Psychiatry 1989; 155 (suppl. 5): 84-89.
14. Ragin AB, Oltmanns TF. *Predictability as an index of impaired verbal communication in schizophrenic and affective disorders*. Brit. J. Psychiatry 1983; 143: 578-583.
15. Ragin AB, Oltmanns TF. *Communicability and thought disorder in schizophrenics and other diagnostic groups. A follow-up study*. Brit. J. Psychiatry 1987; 150: 494-500.
16. Romney DM. *Thought disorder in the relatives of schizophrenics. A meta-analytic review of selected published studies*. J. Nerv. Ment. Dis. 1990; 178: 481-486.
17. Rund BR. *Cognitive disturbances in schizophrenics: what are they, and what is their origin?* Acta Psychiatr. Scand. 1988; 77: 113-123.
18. Rutter DR, Draffan J, Davies J. *Thought disorder and the predictability of schizophrenic speech*. Brit. J. Psychiatry 1977; 131: 67-68.
19. Rutter DR, Wishner J, Callaghan BA. *The prediction and predictability of speech in schizophrenic patients*. Brit. J. Psychiatry 1975; 126: 571-576.
20. Rutter DR, Wishner J, Kopystynska H, Button M. *The predictability of speech in schizophrenic patients*. Brit. J. Psychiatry 1978; 132: 228-232.
21. Salmon PD, Bramley J, Presley AS. *The Word-in-Context test as a measure of conceptualisation in*

- schizophrenics with and without thought disorder*. Brit. J. Med. Psychol. 1967; 40: 253-259.
22. Singer MT, Wynne LC. *Thought disorder and family relations of schizophrenics. IV. Results and implications*. Arch. Gen. Psychiatry 1965; 12: 201-212.
 23. Singer MT, Wynne LC. *Principles for scoring communication defects and deviances in parents of schizophrenics: Rorschach and TAT scoring manuals*. Psychiatry 1966; 29: 260-288.
 24. Taylor WL. *Cloze procedure: a new tool for measuring readability*. Journ. Qtrly. 1953; 30: 415-433.
 25. Tuinman JJ, Blanton WE, Gray G. *The Cloze procedure: an analysis of response distributions*. J. Gen. Psychol. 1975; 92: 177-185.
 26. Wichström L, Holte A. *Confirmatory and disconfirmatory feedback in families of schizophrenics, pathological controls and normals: replication and expansion*. Acta Psychiatr. Scand. 1991; 84: 575-578.
 27. Wichström L, Holte A. *Reciprocated self-disqualification among parents of schizophrenics*. Acta Psychiatr. Scand. 1992; 86: 201-206.

Address for correspondence:

M. Nieznański,

