

# Affective reactivity of speech in patients with schizophrenia and their non-schizophrenic relatives

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*Background:* Studies about cognitive functioning of patients with schizophrenia (language problems in particular) are very limited in Iran. This study aims at evaluating the affective reactivity of speech in Turkish-speaking schizophrenic patients and their non-schizophrenic relatives. *Methods:* In a cross-sectional setting, 30 outpatients with schizophrenia were compared with 30 first-degree non-schizophrenic family members and 30 non-clinical controls. The audio-taped speech samples (10 min each) were analyzed blindly for frequencies of referential communication failure. Levels of referential communication disturbance in speech samples (Communication Disturbance Index, CDI) during two separate sessions were compared in affectively positive versus affectively negative conditions. *Results:* All three groups showed significantly higher frequencies of communication disturbances in the affectively negative condition. The affective reactivity of speech was significant in patients with schizophrenia compared with the controls but not the unaffected relatives. The severity of positive or negative symptoms was not correlated with CDI or level of affective reactivity. *Conclusion:* This study was carried out in a Turkish-speaking sample and supports the idea that referential communication disturbances may be linked to vulnerability to schizophrenia while affective reactivity is associated with manifest illness. Language differences may affect the observed impact of symptom severity on communication failures.

• *Communication disorders, Language, Referential failure, Schizophrenia.*

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Speech and language problems are among the first symptoms described by Bleuler for schizophrenia. The term “loosening of association” refers to the formal thought disorder resulting in an interruption in the coherent path of the speech. These patients frequently associate unrelated ideas. Previous studies have shown that a number of communication disturbances called referential failures (that may happen in natural speech) occur more frequently in speech of patients with schizophrenia (1). When a referential failure occurs, it is difficult to understand the phrase, because the referent is indefinite or is not previously introduced to the speaker (2). Studies report that referential failures occur frequently in first-degree relatives of patients with schizophrenia as well, suggesting that communication disturbances may be one sign of a stable genetic liability to schizophrenia (3, 4).

This type of communication failure exacerbates during the arousal of negative emotions in some (1) patients with schizophrenia (5). These groups of patients are

more sensitive to social stresses (6) that may influence their function in addition. The processes underlying this “affective reactivity” are not well understood. The pattern and the degree of the affective reactivity are reported to be different for first-degree relatives of these patients (1). The correlation of performance of relatives and the severity of symptoms of the patients suggests that the affective reactivity may also be a vulnerability marker for schizophrenia.

Presenting symptoms of schizophrenia have extensive differences among patients. The clinical course and the pathophysiology are not unique either. Studies with different samples (during the course of the illness, different subtypes and diverse ethnicities) will provide results helping a more accurate conclusion. Studies about language problems and communication deficits in patients with schizophrenia are very limited in the Iranian population. The available publications are restricted to semantic priming (7), neologism and clang associations (8).

The current study aims to assess referential failures and affective reactivity in Iranian patients with schizophrenia and compare it to their first-degree relatives and a healthy control group. We hypothesized that communication disturbances might be higher in this sample of Turkish-speaking Iranians in affectively negative conditions, and patients with schizophrenia and their unaffected first-degree relatives might demonstrate higher affective reactivity of speech.

## Materials and Methods

### Subjects

The protocol was approved by the ethic committee of Tabriz University of Medical sciences and was carried out according to the provisions of the Declaration of Helsinki. Participants were enrolled after giving an informed written consent. Participants of the study were recruited from Razi mental clinic. Group A consisted of

stable Turkish-speaking outpatients aged between 18 and 60 years who satisfied the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)* diagnostic criteria for schizophrenia. Exclusion criteria were presence of organic impairments, meeting the criteria for substance abuse or dependence, lack of adequate information about the course of the disorder and severe formal thought disorder interfering with the procedure (e.g. incoherency). Figure 1 describes the flow diagram of participants through the study.

Group B were the first-degree relatives of these patients and group C were healthy Turkish-speaking comparison group recruited through announcement within the medical center. These groups were screened for presence or history of mental disorders as described later. Any diagnosis on axis I resulted in exclusion. Two patients with schizophrenia, three first-degree relatives and one control subject were excluded because they could not continue on narrating the pleasant memory for

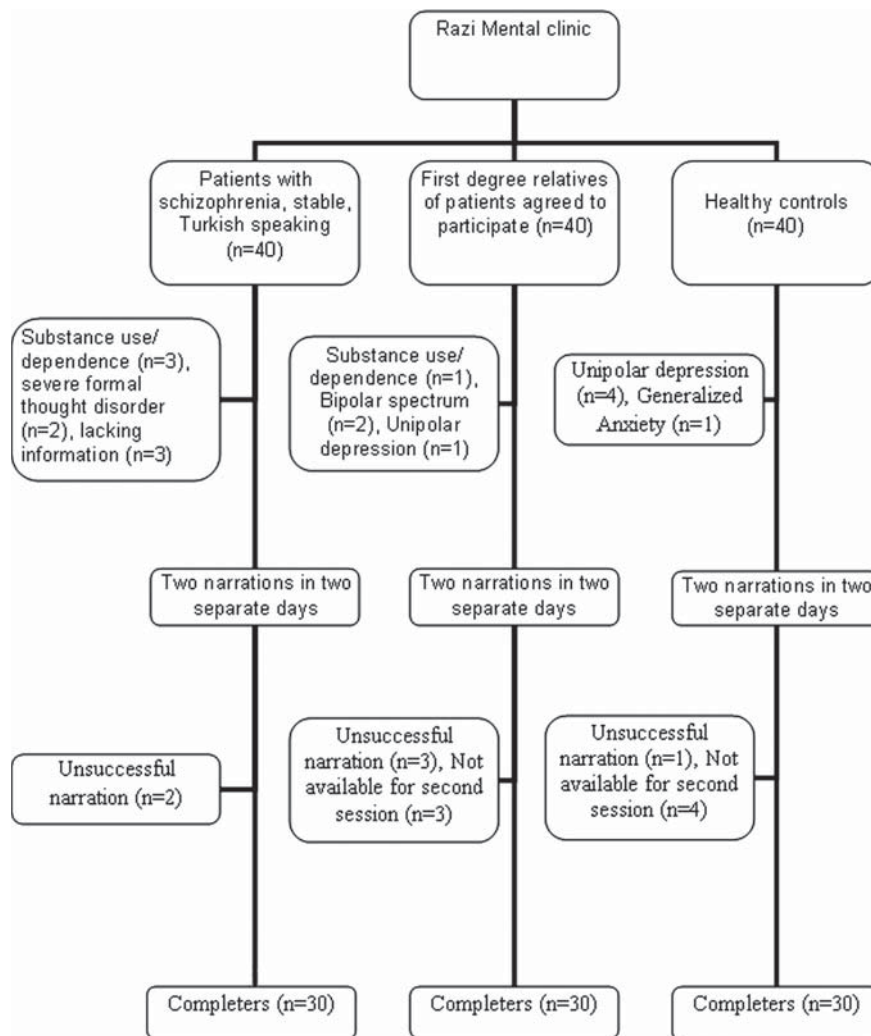


Fig. 1. Flow diagram of participants' progress through the study.

an adequate time. Thus the final study sample consisted of 30 patients, 30 first-degree relatives and 30 non-clinical volunteers (Table 1). These groups were matched regarding age ( $P=0.893$ ), gender ( $P=1.000$ ) and years of education ( $P=0.237$ ). Patients with schizophrenia were more likely to be single ( $P=0.006$ ).

### Procedure

After the first session (the diagnostic interview and providing information), participants were asked to give two separate narratives (each for 10 min, in two separate days) about affectively valenced memories. In the first condition participants were asked to describe a “pleasant memory” or “good memory” from their lives (the affectively positive condition) and in the second they were asked to narrate an “unpleasant memory”, “bad memory” or “distressful event” (the affectively negative condition). The interviewer facilitated the narration by open-ended questions and redirections where appropriate. The narratives were recorded, transcribed and analyzed.

### Measures

The diagnosis of schizophrenia and screening of the other groups was made based on the Structural Clinical Interview for Diagnostic (SCID) (9) and the *Statistical Manual for Mental Disorders* (4th edition).

All speech samples were rated by a same psychiatrist blinded to the grouping of participants. The severity of positive and negative symptoms in patients with schizophrenia were assessed by the Scale for the Assessment of Negative Symptoms (SANS) (10) and the Scale for the Assessment of Positive Symptoms (SAPS) (11). The transcribed narratives were analyzed using the Communication Disturbance Index (CDI) (12). The CDI is a measure focused on the failure in the communication of

meaning in speech. These failures that are described previously (13) are described below: (1) Confused reference, where there is more than one possible referent while the correct choice is not clear; (2) Missing information reference, where the reference to the information is not previously provided for the listener; (3) Ambiguous word meaning, where a word with more than one definite meaning is used and its intended meaning is uncertain; (4) Grammatical unclarity, the structure of the speech does not comply with rules of language and results in unclear meaning; (5) Vague reference, where the word is unclear because it lacks specificity; (6) Wrong word reference, the meaning is unclear because of incorrect choice of word. The frequency of each type of these communication failures per 100 words of the speech was calculated. Language reactivity scores were computed by subtracting CDI ratings in the positive condition from CDI ratings in the negative condition.

### Statistical analysis

The intergroup differences were assessed by comparing total CDI ratings in the two conditions. Possible effect of the demographic characteristics on the CDI rating was evaluated as well. A two-way (group  $\times$  affective condition) repeated-measures analysis of variance (ANOVA, with affective condition as the repeated factor), independent samples  $t$  and chi-square tests were used to compare the groups and the Pearson's  $r$  to assess the possible correlations. The level of significance was at  $P < 0.05$ .

## Results

### Patients

Demographics and characteristics of the completer sample are described in Table 1. The mean score of CDI was 2.0 (0.5) in males and 1.9 (0.4) in females but not statistically

Table 1. Demographic information from patients with schizophrenia, first-degree relatives and the controls.

	Patients with schizophrenia <i>n</i> = 30	First-degree relatives <i>n</i> = 30	Non-clinical volunteers <i>n</i> = 30
Mean age ( <i>s</i> )	36.5 (10.3)	37.2 (11.1)	37.9 (10.1)
Mean years of education ( <i>s</i> )	7.4 (4.1)	8.7 (4.6)	9.3 (4.7)
Male (%)	63.3	63.3	66.7
Married (%)	36.7	73.3	70.0
Mean score of SAPS ( <i>s</i> )	96.0 (44.3)	–	–
Mean score of SANS ( <i>s</i> )	68.5 (30.1)	–	–
Duration of disorder ( <i>s</i> )	6.5 (4.5)	–	–
Previous hospitalization (%)	53.3	–	–
Number of sentences in positive condition ( <i>s</i> )	578.6 (25.7)	593.1 (22.2)	597.4 (20.7)
Number of sentences in negative condition ( <i>s</i> )	560.6 (52.6)	582.0 (23.3)	585.7 (21.5)
Mean score of CDI ( <i>s</i> ) in positive condition	2.0 (0.4)	1.9 (0.4)	0.5 (0.8)
Mean score of CDI ( <i>s</i> ) in negative condition	2.4 (0.6)	2.2 (0.5)	1.0 (0.7)

SAPS, Scale for the Assessment of Positive Symptoms; SANS, Scale for the Assessment of Negative Symptoms; *s*, standard deviation; CDI, Communication Disturbance Index.

different ( $P=0.575$ ). The total CDI rating of patients with schizophrenias ( $n=30$ ) was not correlated with their age ( $P=0.324$ ,  $r=0.186$ ), number of previous admissions to hospital ( $P=0.987$ ,  $r=-0.003$ ), score on SANS ( $P=0.643$ ,  $r=0.088$ ) or SAPS ( $P=0.555$ ,  $r=-0.112$ ).

The patients used a significantly lower number of sentences in the positive condition compared with relatives ( $P=0.049$ ) and controls ( $P=0.007$ ), but the number of sentences in narrating the negative condition was lower compared with controls only ( $P=0.031$ ).

The SANS score of patients was negatively correlated with the number of sentences used in both negative ( $P<0.05$ ) and positive ( $P=0.021$ ) conditions. Nevertheless, the score of SAPS was positively correlated with the number of sentences used in negative ( $P=0.019$ ) and positive ( $P<0.05$ ) conditions.

### Between group comparisons

A two-way repeated-measures ANOVA indicated that groups differed on total CDI rating cross the conditions ( $F=95.96$ ,  $P<0.005$ ). A *post hoc* analysis showed that the significant difference between the groups was due to the higher CDI ratings of both patients and relatives compared with controls ( $P<0.005$ ). The difference between the patients and the first-degree relatives did not reach the significance ( $P=0.302$ ). Figure 2 shows these results where the boxes represent the range and median of CDI for the three groups separately. The mean (standard deviation,  $s$ ) values are given in Table 1.

The main effect of the condition was significant ( $F=73.35$ ,  $P<0.005$ ) and the whole sample made more communication errors in the negative condition compared with the positive condition.

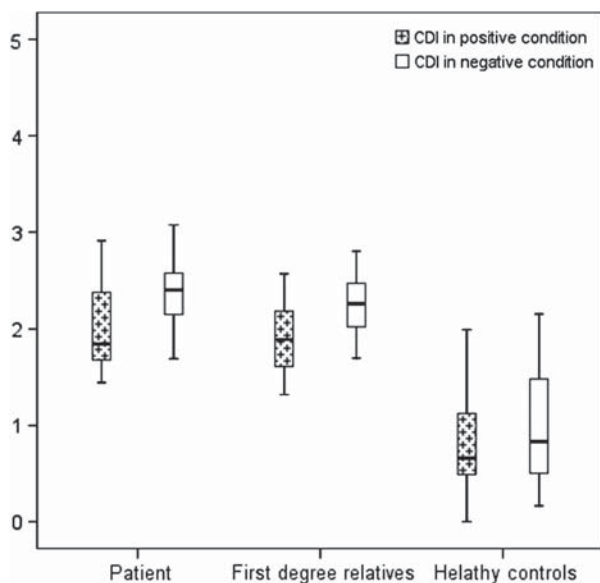


Fig. 2. The Communication Disturbance Index ratings in negative and positive conditions.

The interaction of the condition with group was significant ( $F=4.15$ ,  $P=0.019$ ), indicating a significant difference in degree of reactivity of speech among the groups. This difference could be explained by a higher degree of increase in CDI rating (i.e. higher affective reactivity of speech) in patients with schizophrenia ( $P=0.014$ ) compared with the controls.

### Discussion

This study demonstrated poorer reference performance of Turkish-speaking patients with schizophrenia and non-affected first-degree relatives compared with healthy controls. Patients (but not the relatives) showed increased level of referential failure in emotionally negative condition (i.e. affective reactivity) compared with controls. Congruent with previous reports, this suggests that a general elevation of referential failures may indicate a vulnerability to schizophrenia, but a high level of affective reactivity of speech may be a marker of manifest schizophrenia. In addition, this study provided replication of these results in one more ethnicity and language.

The affective reactivity of speech was first recognized by Docherty et al. (1, 14) where the authors proposed it to be connected to the underlying process of the disorder. This study showed that patients with schizophrenia ( $n=10$ ) and the unaffected parents group ( $n=18$ ) had a poorer performance on positive condition than controls, while only patients showed the affectivity reactivity of speech to a negative condition. These results were replicated in further reports and supported the idea that referential communication disturbances reflect vulnerability to the illness (15). Compatible results are reported in the current study in Turkish-speaking Iranian sample.

The reactivity of speech in patients with schizophrenia is reported to be related to severity of their psychotic symptoms (1, 16) but this may be only restricted to patients without negative symptoms (17). The current study did not observe such a significant relation between CDI and the severity of the illness measured by scores of SANS and SAPS. It seems that there is no obvious difference between clinical characteristics of this study sample and previous reports but their language, which is Turkish. The negative correlation between the score of SANS and the positive correlation of the score of SAPS with the number of sentences in both conditions in one hand and no significant correlation between the number of errors with scores of SANS or SAPS in the other and may explain why these scores were not correlated to CDI. Whether this difference in findings could be related to differences in the language of study samples remains to be investigated in further studies. Previous reports have proposed such a variation between languages with

different grammars and cultural contexts (18). Multicultural countries in which nations with different languages are living very close that gain several cultural similarities are suitable for such studies.

Referential failures are among symptoms of schizophrenia that may interfere with daily life of patients especially with their social and occupational function. According to the results of this study, this problem exacerbates in affectively negative conditions. Patients probably face such a condition frequently. Further studies may also focus on the best pharmacological and non-pharmacological treatment for language problems.

This report is the first from Turkish-speaking community. However, the methodology of this study did not include analysis of the potential effect of medications on the level of affective reactivity or psychotic symptoms. We could not rate the emotional load of the memories for our patients. This limitation is also present in most of the research in this field.

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