



THE PRODUCTION OF SIMPLE SENTENCE STRUCTURES IN SCHIZOPHRENIA

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Language disorder is one of the most significant symptom domains which characterize Schizophrenia Disorder. The aim of the present study which has been carried out by taking into consideration these language problems is to investigate and compare the schizophrenic patients' and control group's speech in terms of simple sentence structure. Fifty patients with schizophrenia according to DSM-IV criteria have been included in the study and compared to fifty healthy subjects matched for age, sex and education level with the patients. The subjects' speech has been evaluated in four stages. These are narrative picture task, story picture sequencing task, semi-structured speech and free speech. The data consists of 8-10 minute recorded interviews. The recordings have been transcribed based on DuBois' Discourse Transcription Symbols. As a result of the statistical and linguistic analyses, significant differences have been observed between simple sentence types' of patients with schizophrenia and healthy subjects'. It has been concluded that due to the possible cognitive problems, patients with schizophrenia use shorter and simple sentences instead of complex sentences compared to healthy subjects.

Keywords: Schizophrenia, Sentence structure, Simple sentence, Language disorder, Thought disorder.

Introduction

Language relevant to biological, psychological and social sides of human behavior is considered a significant means of communication and used for diagnosis and treatment in psychiatry (Thomas and Fraser, 1994). One of the most prominent psychiatric and devastating mental disorders that affect language functions is schizophrenia. The language deficits of schizophrenia patients have long been regarded as a diagnostic indicator of the disorder which is a chronic and severe mental disorder that interferes with a person's ability to think clearly, manage emotions, make decisions and relate to others. Patients with schizophrenia have problems in distinguishing between verbalized thought and external speech (verbal auditory hallucinations), in perceiving and interpreting the world (delusions), in social interactions and motivation (negative symptoms), and in expressing thought through language (thought disorder) (Işık, 2006, Sadock and Sadock, 2007).

Schizophrenia patients have also a tendency to withdraw themselves from the others and their inappropriate behaviors can make human relations difficult. (Jablensky, 2000). As a result of language and thought disorders, patients with schizophrenia show impaired abstract thinking and these deficits in abstract thinking cause them to run into substantial difficulties in social interactions during daily life and work life. Correspondingly, problems such as perseveration, distractibility, clanging, neologisms, echolalia, thought blocking and word salad start to come out (Yavuz, 2008).

Symptoms of schizophrenia reflect abnormalities in multiple aspects of human language and these language problems are considered in different levels of language such as phonology, morphology, semantics or pragmatics. There is also evidence that the speech produced by patients with schizophrenia is syntactically less complex than that of healthy controls. In addition, patients show some deficits in comprehending long and grammatically complex sentences (Kuperberg, 2010). Subsequent analyses of the speech produced by patients with schizophrenia show that their speech is more grammatically deviant (Hoffman and Sledge, 1988) and less syntactically complex than that of controls (Sanders et al., 1995). Studies indicate a higher percentage of simple and compound sentences, and fewer dependent clauses that are not deeply embedded (Fraser et al., 1986; Morice and Ingram, 1982).

In addition, patients with schizophrenia also show some deficits in comprehending long and grammatically complex sentences. Patients' impairment in comprehending syntactically complex sentences correlates with their poor performance on a verbal working memory span task. These findings have generally been taken as evidence that syntactic impairments in schizophrenia are mediated by their WM dysfunction (Bagner et al., 2003; Condray et al., 1996; Condray et al., 2002). Moreover, demands for integrating semantic with syntactic information are often maximal at points of syntactic complexity (Ferreira, 2003; Traxler et al., 2002) and ambiguity (MacDonald et al., 1994; Tanenhaus et al., 1995). Thus, it is possible that an impairment in combining syntactic and semantic information to build up context is characteristic of schizophrenia as a whole and that thought disorder manifests clinically only when this integration breaks down entirely such that language processing becomes dominated by semantic associations between individual words. Within this context, the aim of the present study which has been carried out by taking into consideration these language problems is to investigate and compare the schizophrenic patients' and control group's speech in terms of complex sentence structure.

Methodology

Subjects

Prior to data collection, in order to do research with the patients, the approval of the ethical committee of Dokuz Eylul University was obtained on 06.06.2013. A power analysis has been conducted with regards to the number of the patients living in İzmir as 0.85 % of total population and difference between patients with schizophrenia and healthy subjects in speech disorder with $\alpha = 0.05$ significance level. As a result of this analysis, fifty patients with schizophrenia receiving treatment in Dokuz Eylul University, School of Medicine, Department of Psychiatry and diagnosed according to DSM-IV criteria and fifty healthy subjects, who have been matched for age, sex and education level with the patients, were included in the study. Table 1 shows the demographic information of the patients and healthy individuals.

Table 1. Demographic Information of the Patients with Schizophrenia and Healthy Subjects

	Schizophrenia (n=50)	HealthySubjects (n=50)	<i>p-value</i>
Age	41.98	41	p=0.60
Sex			
Women	17	17	p=1.0
Men	33	33	p=1.0
Education Level	10.9	11.21	p=0.94

Procedure

Data collection was carried out at Dokuz Eylül University, Department of Psychiatry on Wednesdays between 2012 and 2014. Prior to testing, subjects were asked to sign a written consent form. Each subject was tested on one-to-one basis in the office of the psychologist room. In order not to distract patients' attention, the research room was always kept silent during the task. Subjects in the control group were matched for age, sex and education level with patients and were tested in the same way. The speech of all subjects was recorded via Philips LFH0615 recorder and transcribed based on the symbols indicated by Du Bois et al.(1991).

Task

Simple sentence structures of the patients with schizophrenia who received treatment at Dokuz Eylül University, Department of Psychiatry were evaluated in four stages: narrative picture task, story picture sequencing task, semi-structured speech and free speech tasks. For the narrative picture task, the Picnic Picture chosen from Western Aphasia test, was used. For story picture sequencing, the picture story about a man buying a hat was chosen from "VosstanovleniyeReçi u Bolnix s Afaziey" book, was used. Pictures for both tasks were chosen on the basis of their relevance for the Turkish culture. The subjects did not have any difficulties in interpreting the pictures. All tasks were administered to all the subjects in the same order. Anderson (1988) and Wicksell, et al. (2004) indicated that problems in short-term memory are the most apparent, suggesting specific cognitive deficits and can cause a decrease in performance. In order to prevent these problems, subjects were allowed to look at the pictures during the test process. Following this task, they were first asked to talk about the recent situation of Turkey. They were then asked to talk about anything they have wanted. The interview lasted nearly 8-10 minutes and all the subjects' speech was recorded. The recordings were then transcribed using DuBois' Discourse Transcription Symbols. Finally , the sentence structures of healthy subjects and schizophrenic patients were compared statistically.

Data Analysis

Data analysis was conducted Data analyses were conducted in two stages. First, a series of five linguistic and clinical measures which have shown differences between schizophrenics and a variety of control group populations Data analyses were conducted in two stages. First, a series of five linguistic and clinical measures which have shown differences between schizophrenics and a variety of control group populations

Data analysis have been conducted in two stages. First, a series of four linguistic measures which have shown differences between the patients with schizophrenia and healthy subjects have been examined. Following that, further correlations have been examined separately for each task, using statistical tests. T-test has been used to find out the significance levels between patients with schizophrenia and healthy subjects. When the analysis have been completed, findings have been commented in consideration of relevant literature.

Findings

This study has examined the use of simple sentences in the speech of patients with schizophrenia and of the healthy subjects. Following the statistical analysis comparing the simple sentence number in both groups regarding narrative picture task, story picture sequencing task, semi-structured speech task and free speech task, the results have shown that the speech of patients with schizophrenia exhibited a significantly larger use of simple sentences. Table 2 shows the findings of simple sentence use obtained from all tasks.

Table 2. Simple Sentence Use of Patients with Schizophrenia and Healthy Subjects

Simple Sentence Use of the Subjects						
Task	Group	Number of Subjects	Mean Simple Sentence Use	Std. Deviation	Std.Error	p-value
Narration Task	Patients with Schizophrenia	50	10.14	4.57	0.65	0.001
	Healthy Subjects	50	6.44	3.30	0.47	
Story Picture Sequencing Task	Patients with Schizophrenia	50	11.38	6.97	0.99	0.001
	Healthy Subjects	50	5.5	3.20	0.46	
Semi-Structured Task	Patients with Schizophrenia	50	5.90	4.50	0.63	0.001
	Healthy Subjects	50	2.52	2.08	0.30	
Free Speech Task	Patients with Schizophrenia	50	7.78	5.75	0.81	0.001
	Healthy Subjects	50	3.56	2.89	0.40	

Table 2 shows the mean values on simple sentence use of the subjects. As seen in the table, there is a significant difference between patients with schizophrenia and healthy subjects in simple sentence use. The results show that patients used significantly more simple sentences in Narration Task, Story Picture Sequencing Task, Semi-Structured Task and Free Speech Task when compared to healthy subjects ($p=0.001$).

Discussion

The results found in this study show that the production of grammatically complex sentences is impaired in schizophrenia. It has been suggested that impaired syntax processing reflects a risk for the disorder. Kircher et al. (2005) examined the neural correlates of syntax production in people with schizophrenia using functional magnetic resonance imaging (fMRI) and in the comparison between the groups, the number of complex sentences produced was correlated with activation in the posterior portion of the right middle temporal (Brodmann area 21) and left superior frontal (BA10) gyri in the control group but not in the patients. They concluded that the absence of activation in the right posterior temporal and left superior frontal cortex in patients with schizophrenia might contribute to the articulation of grammatically more simple speech in people with this disorder. Relative to healthy subjects, patients with schizophrenia have deficits in both comprehension (Bagner et al., 2003) and production (Thomas et al., 1996; Oh et al., 2002) of syntactically complex sentences. These disorders are especially obvious in patients with formal thought disorder (Rodriguez et al., 2001). It has been proposed that impaired syntax processing reflects a risk for the disorder and patients used less subordinate clauses in their speech (DeLisi, 2001).

This study showed that the speech produced by patients with schizophrenia was syntactically more simple when compared to healthy subjects. In addition, in the research examining the deficits in comprehending long and grammatically complex sentences, patients' were found to have some impairment in comprehending syntactically complex sentences and their poor performance correlated

with their poor performance on a verbal working memory span task. These findings have generally been taken as evidence that syntactic impairments in schizophrenia are mediated by their WM dysfunction (Bagner et al., 2003; Condray et al., 1996; Condray et al., 2002). In addition to these, demands for integrating semantic with syntactic information are often maximal at points of syntactic complexity (Ferreira, 2003; Traxler et al., 2002) and ambiguity (MacDonald et al., 1994; Tanenhaus et al., 1995). Thus, an impairment in combining syntactic and semantic information to build up context can be a characteristic of schizophrenia as a whole and when this integration breaks down entirely such that language processing becomes dominated by semantic associations between individual words.

Condray et al. (2010) found a significant relation between diagnosis, syntactic structure, and temporal demand. Patients were characterized by reduced overall comprehension accuracy compared to controls. More important, patients and controls differed in their patterns of accuracy across the different types of syntactic structure. Finally, cognitive functions predicted but did not completely account for comprehension accuracy. These findings suggest the hypothesis that receptive syntax is disrupted in schizophrenia, and this dysfunction may not be entirely explained by compromised general cognitive ability.

Covington et al. (2005) found that patients with schizophrenia often display unusual language impairments. They surveyed schizophrenic language level by level, from phonetics through phonology, morphology, syntax, semantics, and pragmatics and found some impairments in thought or failure to maintain a discourse plan comprising various dysphasia-like impairments such as clanging, neologism, and unintelligible utterances. Thought disorder appeared to be primarily a disruption of executive function and pragmatics, perhaps with impairment of the syntax-semantics interface. Phonetics was also often abnormal (manifesting as flat intonation or unusual voice quality), but phonological structure, morphology and syntax were nearly normal (some syntactic impairments have been demonstrated).

Conclusion

Patients with schizophrenia often display unusual language impairments from phonetics through phonology, morphology, syntax, semantics to pragmatics. The present study addresses an incomplete question in the literature: whether syntax is intact or not in schizophrenia. Dwelling on the schizophrenic speech in terms of complex sentence structure and we have found that schizophrenia display abnormalities of language. Results showed that patients and controls differed in their production of a complex sentence, with patients exhibiting a significant reduction in their production, compared to the speech of the control group. This was particularly significant in adjectival and adverbial clauses. It is also observed that patients tended to produce fewer complex sentences and more simplex or coordinated sentences. As such, patients tended to make syntactic simplification. It is concluded that these result from an overall cognitive deficit, difficulty in concentrating, distraction, or a preference for expressing simpler ideas

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