Semantic – Pragmatic Attributes and Cognition in Acute and Chronic Schizophrenics: A Case Comparative Study

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Abstract

Schizophrenia is a thought disorder, displaying unusual language and cognitive impairments. There exists a dearth of studies relating the language deficits to the onset of the disorder. This study profiled few aspects of semantic and pragmatic abilities in acute and chronic schizophrenics and compared with their cognitive abilities. One acute schizophrenic and one chronic schizophrenic patient participated in the study. Cognition was assessed using the "Addenbrooke's Cognitive Examination (ACE-R)" Kannada version. Aspects of semantics (semantic storage, recall/access and the word association) and pragmatics were assessed using a test battery.Results showed distinct variations in both subjects in cognitive as well as linguistic aspects (semantic and pragmatic). Abnormalities were found both at single word level as well as discourse comparable to dysfunction of cognition, and onset of the disorder. The findings highlighted the differences in semantic-pragmatic and cognitive aspects in terms of onset of the disorder. Though, the study is a preliminary attempt and warrants further research for substantiation.

Key words: Word association, Discourse.

Language disorder has long been considered a diagnostic indicator of schizophrenic disorder (American Psychiatric Association, 1994). Various distinct hypotheses have been put forth by several researchers, regarding the root problem underlying language dysfunction. Many psychopathologists regard speech disturbances as reflective of an underlying disorder of thinking. While, content and form of schizophrenic speech has been described as deviant by other group of authors. The language disturbances in schizophrenics could be at individual levels or a combination of different levels.

Semantics refers to the meaning of words. Several investigators have reported that patients with schizophrenia are slower and less accurate in words/ word pairs as members of conceptual categories (Chen, Wilkins, McKenna, 1994). Some other studies also suggest that schizophrenia maybe characterized by a disorganized semantic memory store. Pragmatics is the study of how language is used and how language is integrated in the context. A number of researchers have concluded that the primary language impairment in schizophrenia is in the area of pragmatic performance. Crow, (1998) argued that the language disturbances in schizophrenia are a reflection of the way in which individuals with schizophrenia use language.

Cognition refers to the mental processes used in the acquisition and use of language including sensations, perception, attention, learning, memory, language, visuospatial abilities, thinking, and reasoning. Schizophrenia is often associated with cognitive deficits, particularly executive function, attention, memory and language. Specific cognitive deficits have been linked to psychotic phenomena, including verbal hallucinations and disorganized speech. In addition, selective deficits have also been described in the pattern of retrieval from both semantic and episodic memory. Clinically, cognitive dysfunction is a direct predictor of poor social functioning. The existence of specific patterns of cognitive dysfunction

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suggests several important avenues for future research.

However, the nature of language disturbance in relation to the onset of the disorder is poorly understood. Thus, the study aimed at investigating the semantic and pragmatic skills in subjects with acute and chronic schizophrenia and comparing with cognition.

Details	Acute Schizophrenic (X)	Chronic Schizophrenic (Y)
Age/Gender	30 yrs, female	24yrs, male
Language	Kannada	Kannada
Education	B.Sc. Computer science (incomplete)	S.S.L.C (fail)
Complaint	c/o no problem	c/o hand pain since 4 days
Onset	2 months	2 years
Pre-Morbid History	Maintaining well	Well-adjusted personality
Post-Morbid History	Wandering behavior, anger outbursts, decreased personal care, decreased sleep, talking and smiling to self, increased & irrelevant speech, inappropriate dressing, belief that black magic has been done on her.	Decreased interaction, increased suspiciousness and abusive behavior, withdrawal from family, smiling & muttering to self, irrelevant talk, increased religiosity.
Diagnostic Criteria	Auditory hallucinations, delusion of love (?), socio-occupational dysfunction.	Auditory hallucinations, delusion of persecution, delusion of reference, delusion of grandiose, breaks in the train of thoughts, self-absorbed attitude, socio-occupational dysfunction.
Treatment	On antipsychotic treatment for a month	On antipsychotic treatment along with electro-convulsive treatment (ECT) for more than a year

Table 1: Case details and demographics.

Method

Subjects

One acute schizophrenic and one chronic schizophrenic, diagnosed by the consultant psychiatrist based on DSM-IV (A) criteria, participated in the study (Table 1). The subjects were recruited from Kasturba Hospital, Manipal and from Government Hospital, Udupi, Karnataka.

Materials and Procedure

The subjects were tested for cognition, semantics and pragmatics:

Cognition: Cognitive abilities of the subjects were assessed using "Addenbrooke's Cognitive Examination (ACE). The first adaptation of this test in Indian language (Malayalam) was provided by Mathuranath, Hodges, Mathew, Cherian, George, and Bak (2004). Further, this Malayalam version of ACE (M-ACE) was validated on 488 subjects of age 55 – 75 yrs (Mathuranath, Cherian, Mathew, George, Alexander, Sarma, 2007). Kannada version of ACE was developed and standardized on 68 subjects (age 40 – 74 yrs), by the Department of Neurology, Kasturba Hospital, Manipal, (2007). The test checks cognition under 5 sections of *Attention and Concentration*, *Memory*, *Verbal Fluency*, *Language*, and *Visuospatial abilities*. Table 2 provides the subdivision of the 5 sections of ACE and the split of scores, with the total score summing to 100. Instructions for the test were given verbally, except for the section of 'Language' for which instructions were given in writing. The obtained scores were then compared to the normative (cut-off score <88).

Semantics: **Included three measures:**

a. Semantic storage: A spoken word-to-picture matching task was given involving the presentation of 10 pictures from various lexical categories. Score of 1 was given for each correct response.

b. Recall/access: Included three tasks:

(i) Confrontation naming task: 5 nouns from various lexical categories and 5 verbs were presented and the subject named the picture. Score of 1 was given for every correct response. *(Pictures were black & white line diagrams taken from "With a little bit of help", language training manual).

(ii) Category fluency task: 2 lexical categories were given and subjects

were instructed to name as many items possible under each category for 1 min. Score of 1 was given for every correct response.

(iii) Letter fluency task: 2 phonemes, commonly used in Kannada were given and were asked to generate as many words starting with the given phoneme in 1 min. Score of 1 was given for every correct response.

c. Word association: A list of 10 words (abstract & concrete) was prepared and rated on familiarity and concreteness by 3 native Kannada speakers. Equal representations of abstract and concrete words (5 each) were taken in the list. Words from the list were presented orally and the subject had to give the most similar or associative word for the given stimuli. The experimenter recorded the responses and scored 1 for each of the most associative response**.**

Pragmatics: A 'pragmatic protocol' by Prutting & Kirchner (1987) was adopted for profiling of pragmatics. Two conversations were recorded for each participant, first with a familiar and second with a non-familiar partner (15 mins each). The protocol consists of 30 parameters classified into *verbal*, *paralinguistic*, and *nonverbal aspects*. The experimenter rated the conversation samples on these parameters, either as appropriate or inappropriate.

Results

Performance on cognitive measure indicated that the acute schizophrenic had better attention and concentration when compared to the chronic schizophrenic, but was more impaired for memory and verbal fluency. While both subjects' total score fell below the cut-off score (< 88), indicating cognitive dysfunction (Table 2).

Acute Schizophrenic (X)	**Chronic schizophrenic (Y)**
Attention and concentration: [Orientation: 10/10, Registration: 3/3, Attention & Concentration: 5/5] **Total: 18/18**	Attention and concentration: [Orientation: 5/10, Registration: 3/3, Attention & Concentration: 4/5] **Total: 12/18**
Memory: [Recall: 2/10, Anterograde: 3/7, Retrograde: 1/4, Recognition: 3/5] **Total: 9/26**	Memory: [Recall: 3/10, Anterograde:4/7, Retrograde: 3/4, Recognition: 1/5] **Total: 11/26**
Verbal fluency: [Letter: 1/7, Categorical: 3/7] **Total: 4/14**	Verbal fluency: [Letter: 5/7, Categorical: 3/7] **Total: 8/14**
Language: [Comprehension: 3/8, Writing: 1/1, Repetition: 4/4, Naming: 7/12, Reading: 1/1] **Total: 16/26**	Language: [Comprehension: 6/8, Writing: 0.5/1, Repetition: 4/4, Naming: 6/12, Reading: 1/1] **Total: 17/26**
Visuo-spatial abilities: [Visuo-spatial abilities :4/8, Perceptual abilities: 8/8] **Total: 12/16**	Visuo-spatial abilities: [Visuo-spatial abilities :7/8, Perceptual abilities: 8/8] **Total: 14/16**
Overall ACE Score: 59/100	Overall ACE Score: 62/100

Table 2: Subjects' performance on Cognition (ACE – R, Kannada).

Semantic measure assessment revealed poor performance by chronic schizophrenic (Y) on word association task. However, chronic schizophrenic (Y) performed better on recall/access task when compared to acute schizophrenic (X) (Refer Table 3).

Acute Schizophrenic (X)	**Chronic Schizophrenic (Y)**
Semantic storage: 10/10 **Total: 10**	Semantic storage: 10/10 **Total: 10**
Recall/access: - Confrontation naming task (Noun & Verb): 10/10 - Category fluency task: animals: 9, body parts: 8 - Letter fluency task: /k/- 5, /a/- 3 **Total: 35**	Recall/access: - Confrontation naming task (Noun & Verb): 9/10 - Category fluency task: animals: 9, body parts: 15 - Letter fluency task: /k/- 6, /a/- 9 **Total: 48**
Word association: 8 **Total: 8**	Word association: 3 **Total: 3**

Table 3: Performance on semantic measures.

Performance on pragmatic domain was considerably impaired in both the subjects, though on different parameters of verbal, paralinguistic and nonverbal aspects. Table 4 shows a few of the more significant parameters.

Verbal Aspects	Variety of speech acts	Topic selection	Topic initiation	Topic maintenance	Pause time	Lexical selection
X	–	–	–	+	–	+
Y	–	+	+	–	–	–
Paralinguistic Aspects	Intelligibility		Fluency	Prosody	Vocal quality	
X	–		–	–	–	
Y	–		–	–	–	
Nonverbal Aspects	Eye gaze		Facial expression	Gestures	Body posture	
X	–		–	–	–	
Y	–		–	–	–	

(Key: + indicates appropriate, - indicates inappropriate)

Table 4: Performance on pragmatic measures.

Discussion

There is increasing evidence that cognitive deficits are not global and generalized, rather are specific and selective. Similarly the test of cognition in the present study revealed a difference in the two subjects in orientation task, memory task, verbal fluency, aspects of language and visuo-spatial abilities. Semantic memory has been conceptualized as an associative network. The pattern of recall depends upon both the strength and the number of associative links with other words in the network. Schizophrenic patients recall fewer words than controls in a retrieval task (Nester, 1998). More interestingly, in this study both subjects showed poor overall performance in word recall, suggesting a specific impairment in either the structure, or modulation of this associative network.

On semantic tasks, difference in performance was observed for category and letter fluency. This could be owing to either problem at access/retrieval, and/or using semantic knowledge effectively, both being impaired in individuals with schizophrenia (Marcel, 1983). Further, Kuperberg & Caplan, (2003), reported that poor verbal fluency in patients with chronic schizophrenia may partly be attributable to reduction in semantic store. Word association task showed poor performance by both the subjects, wherein they tended to explain meaning of the given stimuli (word), rather than giving a similar and the most associative word. This finding also supported findings of Gordon's (1982) study. Further, Johnson and Shean (1993), in their study found that some patients with negative symptoms were unable to put their idiosyncratic associations into meaningful sentences, and patients with positive symptoms were unable to place common associations in meaningful sentences.

For pragmatic task, performance varied for the subjects in relation to onset. The verbal aspects (topic selection, initiation, change, etc.) were affected in subject with acute schizophrenia. The increased pause time within responses can be correlated to recall deficits, supported by the findings of Alpert, Clarck and Pouget, (1994). On the other hand, subject with chronic schizophrenia had impairments more in terms of topic maintenance and specificity of the topic. The subject deviated much from the topic but would eventually connect them all and make it look meaningful. Also the variety of core speech act was limited in both the subjects. The paralinguistic aspects (intelligibility and fluency) were restricted in the acute schizophrenic subject owing to limited speech output and imprecise articulation. However, the subject with chronic schizophrenia exhibited inappropriate prosody (monotonic), intelligibility and vocal quality. Prutting and Kirchner, (1987) concurred that persons with schizophrenia show deficits in decoding basic emotional expressions. On nonverbal aspect of pragmatics, both subjects showed deficits (inappropriate eye gaze, facial expression and body posture). They also exhibited difficulties in performing and understanding appropriate gestures when using language in context.

Conclusions

Schizophrenia is a complex disorder demonstrating abnormalities in both language comprehension and output. The present study reports abnormalities at the level of single words (deficits in the structure and function of lexico-semantic memory) as well as in discourse

(abnormal relationships between sentences) in relation to cognition and onset of symptoms in schizophrenics. However, further validation of the results is required to assert the findings with relation to the onset.

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