Discourse Analysis In Psychosis: Characteristics of Hebephrenic Subject's Speech

M.C. Noël-Jorand[1], M.Reinert[2], S.Giudicelli[3] and D.Dassa[3]

[1] Biomathematic and Statistic Department, Timone Medical School of Marseilles.
[2] CNRS URA-259, Mathematic and Linguistic, Toulouse University.
[3] Psychiatric Department, Timone Hospital, Marseilles.

Abstract

Objective: The development of advanced methods based on progress in data analysis and computer technology has led to a better understanding of the structure of discourse and the abnormalities occurring in the syntax and semantics of psychotic subjects'speech patterns. In the present study, discourse analysis was performed on the language produced by a hebephrenic patient, which was collected during a period of several months. **Method:** The method used here involves the use of the Alceste software program to model the main patterns of word distribution occurring in a corpus, with a view to identifying the repetitive language patterns most frequently used by the speaker. **Results and Conclusion:** : Hebephrenic subject produced specific speech without any semantic or syntactic impairments and language communication disturbances but with a poverty of content of speech, however. He used very simple, linear forms of speech (metonymic speech) without any digressions, metaphors, imaginary ideas. He seemed to be completely engrossed in the present reality, possibly due to some lack of imaginary or symbolic representative ability. Analysis of the underlying syntactic processes showed that the patient seemed to exhibit a minimum sense of identity based on his own pathology and the world organized around it. This study also shows how greatly verbal behaviour differs between schizophrenic patients with prominent positive versus negative symptoms.

Résumé

Objet : Les avancées de la science en matière d'analyse des données et de technologie informatique a permis le développement de méthodes nouvelles dans l'exploration des structures du discours conduisant à une meilleure compréhension de celui-ci et des altérations l'affectant via la sémantique et la syntaxe particulièrement chez le sujet psychotique. L'étude présente est celle d'une analyse d'une production langagière d'un sujet hébéphrène récoltée sur une période de plusieurs mois. **Méthode :** Celle utilisée ici fait référence à la technique informatisée Alceste permettant de modéliser la distribution de vocabulaire d'un corpus et d'y identifier, par exemple, les systèmes langagiers répétitifs, c.-à-d. ceux dont le sujet qui parle use le plus fréquemment. **Résultats et Conclusion :** Comparé au sujet dit normal, le sujet hébéphrène produit un discours spécifique correct sans faute, cohérent, bien planifié mais dont le contenu est pauvre, simpliste, linéaire, métonymique sans digression ni métaphore aucune. L'hébéphrène semble complètement "scotché" à la réalité sans représentations imaginaires ou symboliques. L'analyse souligne avec intérêt l'existence, via la syntaxe, d'une identité à minima à travers le monde de sa pathologie le différenciant profondément du schizophrène délirant.

Keywords: Discourse Analysis, Alceste software program, Hebephrenia, Schizophrenia with negative symptoms.

1. Introduction

In the field of psychiatry, language constitutes one of the most valuable investigative and therapeutic tools for working with patients. Some developments in the cognitive and linguistic sciences have contributed during the last few years to achieving a better understanding of the deviances and irregularities occurring in the language of psychotic subjects (Thomas and Fraser 1994; Critchley 1994). Progress in both the science of data analysis and artificial

intelligence technology has led to the development of advanced methods for investigating discourse and language structure in pathologic sujects with language communication disorders (Blanchet and Noël-Jorand 1997, David et al. 1994; Gardfield et al. 1992; Hand 1985; Hoffman, 1987; Noël-Jorand et al. 1995, 1997; Servan-Schreiber, 1986). In the context of psychosis, schizophrenia is a category which shows wide intra-individual variations. Language, which is unique in each subject and constitutes a very individual product, can reflect how a patient copes with his disease. Many language studies have been carried out on schizophrenic patients exhibiting positive symptoms, but very few on patients with negative symptoms (hebephrenic subjects) (Andreasen 1986, 1991; Chaika 1974, 1990; Docherty 1996; Fenton and Glashan, 1991; Hoffman et al. 1982, 1985, 1988; Liddle 1987; Lorenz, 1968; Massel et al. 1991; Noël-Jorand et al. 1997; Rochester and Martin 1979).

The present study was designed to investigate the speech of an hebephrenic patient (subject suffering from schizophrenia with prominent negative symptoms). A computer-assisted method of discourse analysis, the Alceste software program (Reinert, 1990, 1993) was used here to investigate the language disturbances detected in samples of a schizophrenic patient' s speech which were collected during the course of several months. This discourse analysis technique consists basically (via a top-down hierarchical classification program (Benzecri, 1981)) of modeling the main patterns of word distribution occurring in a written or spoken text and identifying the speaker' s main linguistic habits. Based on samples of a subject' s language production, this method can therefore be used to determine: (a) the structure (planning, cohesion) of the speech containing various types of discourse dealing with various topics, (b) the specific syntax revealed by the choice of words used at each level of discourse, (c) the verbal behavior and the possible existence of syntactic or semantic impairments. This discourse analysis technique has been tested several times by various authors (Navarro 1990; Noël-Jorand et al. 1995, 1997; Marchand and Navarro 1995; Reinert 1990, 1993).

2. Technique and method

The discourse analysis was performed here on the speech of a patient (Mr P). Mr P. was a 53-year-old man with a history of chronic schizophrenia of the disorganized (also called hebephrenic) type with prominent negative symptoms according to the DSM-III-R (APA, 1987). He was admitted to hospital for the first time at the age of 27 years, when he complained that he was feeling that people were sending thoughts into his head. He became socially disintegrated, his self-care was poor, and he was unable to keep a series of menial jobs. The symptoms of thought insertions continued to occur occasionally and became periodically disorganized. His affective behavior was inappropriate, and he sang and laughed to himself. Most of the time, he appeared depressed, suffered from sad moods, anergia, anhedonia and low self-esteem and had difficulty in socializing. He had a 27-year history of psychotic episodes and had been admitted to hospital more than 10 times. Prior to his most recent hospitalization, he had been taking haloperidol decanoate 175 mg once a month and biperiden 4 mg per day as well as flunitrazepam 2 mg per day. His psychotic symptoms had kept been under reasonable control but most of the negative symptoms had persisted. Several weeks later, Mr P. was discharged to a psychiatric convalescent home.

The patient was being given language therapy once or twice a week. Twelve improvised one-hour speeches were recorded by the therapist during a five-month period on a tape-recorder with the patient' s informed consent. As in the case reported by Chaïka (1974) the patient was in fact delivering monologues aimed at the listener. The discourse analysis method used here has been tested several times using Alceste software (I-Image-Society), a lexical analysis program (Reinert 1990, 1993; Navarro, 1990; Noël-Jorand et al., 1995, 1997). This technique

was based on the method originally developed by Benzecri (1981) for analysing linguistic material, which was an extension of the research originally carried out on the mathematical structure of language (Harris 1971). This method can be used to determine the main word distribution patterns within a text or a discourse (a corpus). The technical procedure leads to selecting classes, each of which is determined by a pool of words which are mathematically linked together and have the most significant frequency of occurrence, i.e. those which the speaker tended to use most repeatedly. These classes with their content and function words subscribe to different types of discourse with a specific vocabulary and syntax. Here it was proposed to analyse the various oral accounts of a schizophrenic patient (the 12 speech samples combined together), taken to form a single corpus. The method of text analysis applied to this corpus involved various main stages, which were described in a previous study in which the discourse of normal subjects was analysed (Noël-Jorand et al. 1995). The method involved 5 stages as follows:

2.1. Defining contextual units (CUs).

The stage 1 consisted of scanning and cutting up the corpus in CUs (context units: 10-20 words) but at stage 3, this segmentation procedure could be varied to ensure the stability of the various classes of words in the corpus (Benzecri, 1981; Noël-Jorand et al. 1995; Reinert 1990).

2.2. Searching for simple forms among the vocabulary and setting up dictionaries of forms.

The simple forms were divided into 2 classes: (a), those which were amenable to analysis (content words) and which were subsequently used to calculate the data matrices and (b), the suppletory forms (function words) which were subsequently used only to help to describe the classes when we reached stage 5.

2.3. and 2.4. Calculating the data tables and searching for the most representative CU classes in the corpus.

The program then established a matrix of data which was used to check the presence or absence of each word in each CU. Lastly, the Alceste-software program defined classes of words associated in a same context, with a top-down hierarchical classification program (Benzecri, 1981). The procedure was iterative and maximized a chosen criterion, which was here a chi square (Benzecri, 1981; Noël-Jorand et al. 1995, Reinert, 1990).

2.5. Describing the classes with a view to interpreting them.

The procedure used to analyse the classes of extracted CUs involved 2 stages:

- Collecting the vocabulary most typical of a given class. This yielded a list of the words with the most significant frequency of occurrence. This list therefore contained two categories of words satisfying chi square > 2.05: content words and function words. It is worth noting that the suppletory forms were not used to set up the classes, but that the degree of significance of their presence/absence in the CUs selected in the various classes was calculated.

- Extracting the CUs which were the most representative of their class (the CUs including the selected words): this provided a key to the meaning of the classes via the actual sentences extracted from the corpus. It should be noted that each word selected in the various classes can be traced back to the original CU, in order to identify its environmental context, i.e., the neighbouring words in the text.

3. Results and Discussion

3.1. Main features of the corpus:

```
Total number of occurrences ................: 20,616
Total number of separate forms.............:  2,313
```

Standard parameters with double classification were used in accordance with the volume of the corpus, i.e. using 12 and 14 as number of words in a CU in order to obtain the classes the most stable and independent of the choice of a single parameter. The result was:

`Total number of CUs classified ...........:  1,202`; 804 (62.23%) of these, which were ranked very high, were analysed in detail and used to draw up the classes.

`Number of forms selected with CHI2 > 2.05....:    538` ; 337 of these contained content forms which were used to set up classes. Two classes only were drawn up, which were composed as follows:

```
 Class 1: 468 CUs, i.e. 58.21% of all the CUs selected, 100 forms selected.
 Class 2: 336 CUs, i.e. 41.79%    "            "         "   86 forms selected.
```

Concerning the word distribution in two classes, it turned out that the speech consisted mainly of verbs, nouns, pronouns and markers of discourse relations. No unknown words (not included in encyclopedic dictionaries) were observed in the corpus. Some of the ratios of occurrence, such as the verb/adjective ratio were very high. It can be stated first that the rate of occurrence of separate forms and context units (CUs) collected here was reduced by half in comparison with the language production of normal subjects and schizophrenics with positive symptoms, based on an analysis of the same number of recorded 1-h speeches (twelve) using the same Alceste technique. The language production of the hebephrenic patient seems to be very restricted. It is worth noting that no unknown terms including neologisms or agrammaticisms occurred here, such as those reported in schizophrenia with positive symptoms by ourself (Noël-Jorand et al, 1997) and other authors (Chaika, 1974, King et al, 1991). Some linguistic markers such as markers of the relationship between speaker and listener were found to be as high in the hebephrenic patient as in schizophrenics with positive symptoms and higher than in normal subjects (Noël-Jorand et al, 1995, 1997). As speakers, hebephrenic and schizophrenic patients are subjects who are able to relate to the listener. They are not withdrawn from the world as sometimes described (Andreasen and Flaum, 1991; Fenton and Mc Glashan, 1991).

3.2. Most significant occurrences in each class:

Each class contained two categories of significant words, which describe the given class and serve to interpret it: i.e., the content and function words. Here we shall deal only with the words having the most significant frequency of occurrence in each class. Each class can be labelled so to speak by the, three or four most frequently recurring words analysed among all those that the class contained: Class 1 can thus be said to have contained general discourse about the world, people and himself, how he was alone and ill: "World" (Chi Square (CHI2) = 9.94), "home" (CHI2 = 9.94), "alone" (CHI2 = 9.49), "ill" (CHI2 = 8.75) and "appartment" (CHI2 = 8.75). Class 2 contained a discourse about the time spent during the day, how he killed time and the things relating to his own pathology: "the hours" (CHI2 = 31.50), "smoke" (CHI2 = 25.65), "drink" (CHI2 = 15.53), "fatigue" (CHI2 = 12.68) and "injection" (CHI2 = 9.84).

If we look at the significant function words selected within each class, the syntax, which was deliberately masked up to now (see the method section 3), shows up again but has undergone a change. Here a basic syntax is observed, linked to the content words selected in each class,

i.e., one which was probably built up at the same time as the speaker chose his words (Noël-Jorand et al., 1995, 1997).

3.2.1 Class 1:

This class contained a discourse centering on the opposition between the world, people, things and the patient himself, alone and ill: "world, people", content words including especially his "wife", his "family", the "physicians", the "Professor Giudicelli", the "medical social workers", and most generaly the "French state", the "Communist party", the "police". The patient is "alone" and "ill", he has the "invalid" status and receives a "pension" but he does not want it, he wants to work. He does not want to take "drugs". He claimed he had the "right" to "stay quietly at home", he wanted to "go back" home and "rest". Among the list of significant function words linked to content words within class-1 discourse, there were nominative pronouns referring to the third person and possessive pronouns referring to the first person initiating confused pronominal references. The significantly frequent rate of occurrence of words such as "and", "but", "or", "then", "moreover", "in addition", etc, shows that the speech in this class was produced using a narrative style (Noël-Jorand, 1995 and 1997). The speaker was attempting here to phrase thought which remained elusive using function words such as "everybody, "some, any or nobody", "anyone" and "nothing". The auxiliary verbs "to be and to have" were significantly frequent, mainly in the third person and in the present tense. The sole modal verb having a significant frequency of occurrence was "to know". He "knew" all about the world organisation, the police, the Communist Party, the French State, etc. He knew exactly what he wanted and what was good for him.

Concerning the class-1 discourse we can say that the patient complained about many things, including life in general. He attempted to phrase his elusive thoughts using words such as the world, people, things, somebody, nobody, something, nothing, the French State, etc. In this discourse he seemed to be undisturbed and told his story slowly to the therapist in a simple narrative style without any digressions. His class-1 speech as well as the class-2 speech (described below) were unsophisticated without any metaphors, or imaginary ideas: it was a "linear", metonymic language with a limited level of thought content. His language production did not, however, show any impairments or confusion: it was poor but correct. The patient as speaker seemed to communicate efficiently and easily with his listener, without any of the communication disturbances or disorganisation of the speech mentioned by various authors in connection with schizophrenia (Chaika, 1974, 1990; Docherty et al., 1996; Hoffman et al., 1985): nor were any deficits in the planning, the cohesion or the self-monitoring of the discourse, contrary to what was observed in the case of a schizophrenic subject with positive symptoms (Noël-Jorand et al, 1997). The function words labelling class 1, showed ambiguous pronominal references probably reflecting the fact that he had a disturbed mental image of himself, as did the subjects suffering from schizophrenia with positive symptoms (Estroff, 1989 and Noël-Jorand et al., 1997). This class-1 syntax therefore gave us access to the speaker' s thought processes and thus to that part of the inner experience concerning his mental image of himself. However the possessive and nominative pronouns in the first and third persons used here together in the same discourse did not produce a confused message such as the "salad discourse" described by Lorenz (1968) and Rochester and Martin (1979), which was also observed in our previous discourse analysis study on the speech of schizophrenics with positive symptoms (Noël-Jorand, 1997 et al.). It can therefore be said that in schizophrenic subjects with positive and negative symptoms, a disturbed mental image of the speaker himself does not result in the same verbal behaviour, since the speech of the former group is psychotic with communication disturbances, whereas that of the latter is not.

3.2.2. Class 2:

A single topic labelled the class-2 discourse: the present time and the speaker' s activities during the various hours of the day: "today" or "yesterday". The patient told to the therapist what he had done that day: he "smokes" "cigarettes", but the "tobacco" makes him "husky". As he "coughs" a lot he should "stop" smoking. As it is a "hot day" he should "drink" some "water" and "have a nap". For the recording, he prefers to "answer" questions rather "speaking" freely, because in this case he has to "think": to think "tires" him. "It is not worth" "recording" what he says, because he does not "remember" anything. This "afternoon" he wants to "go for a walk". He does not want to have another "injection", they "must stop" it: the injections are "killing" him, they are "shit", with the injections he "is enduring the worst". He has a "headache". He is "exhausted, dead tired", his "plan" is to wait for the "evening" to "sleep". All the times of "day" were mentioned: "hours", "afternoon", "evening". the modal verbs with a significantly frequent rate of occurrence were "to be able, to have to and to believe". The function words labelling class 2 were nominative pronouns referring to the first person: the verb "be" was used in the present tense in the first person. Many things were numbered, mainly the hours: "quarter of an hour", "half-hour", "two", "five", "six", etc. No distance was set between what the patient was saying and what he had actually done. He was "stuck like glue" to the reality, without making any incursion into the imaginary or symbolic spaces. The schizophrenic discourse in comparison with the normal discourse as analysed using the same method (Noël-Jorand et al, 1997) showed here in the patient a different organization or use, of the Real, Imaginary and Symbolic spaces: a difference in his essential being in comparison to the normal subject, as described in the Lacan' s theory of RSI in psychosis (1981). The class-2 syntax gave the patient a place in his discourse: "I am" occurred in the present tense with a significantly high rate of occurrence mainly in the CUs based on his own pathology and the various things organized around this pathology. The patient has found a possible place for himself among the various things relating to his own pathology and the surrounding world, including his medical treatment, life in hospital, ect. For patient, this might play the role of a kind of sense of identity, however minimal it may be. The finding that a possible sense of identity was reflected in the discourse of a schizophrenic is of great importance, since in a previous study, no such characteristic was observed in the speech of a schizophrenic patient with delusions (Noël-Jorand et al., 1997). This suggests that the minimum sense of identity produced by disease itself enables patients to avoid succumbing to delusional psychosis.

In conclusion the hebephrenic patient who is a schizophrenic subject exhibiting negative symptoms produced a specific type of verbal behaviour and pattern of discourse. Schizophrenic subjects were therefore found, on the basis of our discourse analysis studies using the Alceste-software program, to differ greatly in their verbal behaviour and discourse patterns, depending on whether they have positive or negative symptoms. In studies on speech in schizophrenic patients, it is therefore recommended that from now on, subjects with positive or negative symptoms should be dealt with separately: in most previous studies, including the most recent ones on behavioural disturbances in schizophrenia using various language analysis methods, the populations of schizophrenic patients investigated were selected without making this necessary distinction between patients with prominent negative symptoms and those with prominent positive symptoms.

References

Andreasen NC. and Grove WN. (1986) Thought, language, and communication in schizophrenia: diagnosis and prognosis. Schizophr. Bull. 12, 348-358

Andreasen NC and Flaum M. (1991). Schizophrenia: the characteristic symptoms. Schizophr. Bull. 17:1, 27-49.

A.P.A. (1987). Diagnostic and statistical manual of mental disorders, 3rd rev. edn. American Psychiatric Association Press, Washington.

Blanchet A, Noël-Jorand MC and Bonaldi V. (1997). Discursive strategies of subjects with high altitude hypoxia: extreme environment. Stress Med. 13, 151-158.

Benzécri JP. (1981). Pratique de l'Analyse des Donn,es; Linguistique et Lexicologie. Dunod, Paris.

Chaïka E. (1974). A linguistic looks at schizophrenic language. Brain Lang. 1, 257-276.

Chaïka E. (1990). Understanding psychotic speech: Beyond Freud and Chomsky. Charles C Thomas, Sringfield. pp 310.

Critchley EMR. (1994). Linguistics in a neuropsychiatric frame a look at the dialogue of brain and mind. Brit. J. Psychiat. 165, 573-576.

David AS, Garfield DA and Rapp C. (1994). Application of artificial intelligence principles to the analysis of "crazy" speech. J. Nerv. Ment. Dis. 182, 205-211.

Docherty NM, DeRosa M and Andreassen NC. (1996). Communication disturbances in schizophrenia and Mania. Arch. Gen. Psychiat. 53, 358-364.

Estroff SE. (1989). Self, identity, and the subjective experiences of schizophrenia: In search of the subject. Schizophr. Bull. 15, 189-196.

Fenton WS, Mac Glashan TH. (1991). Natural history of schizophrenia subtypes: II. Positive and negative symptoms and long-term course. Arch. Gen. Psychiat. 48, 978-986.

Garfield DA, Rapp C and Evens M. (1992). Natural language processing in psychiatry: Artificial intelligence technology and psychopathology. J. Nerv. Ment. Dis. 180, 227-237.

Hand DJ. (1985). Artificial intelligence and psychiatry. Cambridge: Cambridge University Press.

Harris ZS. (1971). Structures math,matiques du langage. Dunod, Paris.

Hoffman RE, Kirstein L, Stopek S, et al. (1982). Apprehending schizophrenic discourse: a structural analysis of the listener's task. Brain Lang. 15, 207-233.

Hoffman RE, Hogden GL, Smith H., et al. (1985). Message disruptions during syntactic processing in schizophrenia. J. Commun. Disord. 18, 183-202.

Hoffman RE. (1987). Computer simulations of neural information processing and the schizophrenia-mania dichotomy. Arch. Gen. Psychiat. 44, 178-188.

Hoffman RE and Sledge W. (1988). An analysis of grammatical deviance occurring in spontaneous schizophrenic speech. J. Neurolinguist. 3, 89-101.

Lacan J. (1966). Ecrits. Champ Freudien. Paris, Seuil.

Liddle PF. (1987). The symptoms of chronic schizophrenia: a re-examination of the positive-negative dichotomy. Br.J.Psychiat.

Lorenz M. (1968). Problems posed by schizophrenic language. In HJ Vetter (Ed.), Language behavior in schizophrenia. Charles C. Thomas, Springfield.

Marchand P and Navarro C. (1995). Dialog organization and functional communication in a medical assistance task by phone. Percept. Mot. Skills. 81, 451-461.

Massel HK, Corregan BW, Liberman RP. (1991). Conversation skills training of thought disordered schizophrenic patients through attention focusing. Psychiat. Res. 38, 51-61.

Navarro C. (1990). Functional communication and problem solving in a bus traffic-regulation task. Psychol. Rep. 67, 403-409.

Noël-Jorand MC, Reinert M, Bonnon M and Therme P. (1995). Discourse analysis and psychological adaptation to high altitude hypoxia. Stress Med. 11, 27-39.

Noël-Jorand MC, Reinert M, Giudicelli S and Dassa D. (1997). A new approach to discourse analysis in psychiatry, applied to schizophrenic patient speech. Schizoph. Res. 25, 183-198.

Reinert M. (1990). Une m,thodologie d' analyse des donn,es textuelles et une application: Aur,lia de G. de Nerval. Bull. M,thod. Sociol. 26, 24-54.

Reinert M. (1993). Les mondes lexicaux et leur logique … travers l' analyse statistique d' un corpus de r,cits de cauchemards. Lang. Soc. 66, 5-38.

Rochester SR and Martin JR. (1979). Crazy talk: A study of the discourse of schizophrenic speakers. Plenum Press, New-York.

Servan-schreiber D. (1986). Artificial intelligence and psychiatry. J. Nerv. Ment. Dis. 174, 191-202.

Thomas P and Fraser W. (1994). Linguistics, human communication and psychiatry. Brit. J. Psychiat. 165, 585-592.