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LEXICAL AND GRAMMATICAL ANALYSIS OF SCHIZOPHRENIC PATIENTS' LANGUAGE: A PRELIMINARY REPORT

The aim of this research on a group of 14 schizophrenic patients and 14 healthy people was to describe specific features of the language of people suffering from paranoid schizophrenia, especially those in the area of lexis and grammar. The theoretical basis rests on the distinction between the two basic clinical syndromes of schizophrenia: the positive and the negative. The underlying assumption – according to the holistic model of the human being – was that the particular clinical syndromes typical of schizophrenia are reflected in the language and, analogous to the positive and negative syndromes of clinical schizophrenia, in the positive and negative syndromes of language disorder. Such an approach tries to reconcile the clinical and the linguistic points of view which, in the relevant literature, are most often described as separate paradigms, and to show that the human being is an entity, hence one cannot analyze linguistic processes independently of other psychic processes, including the disease processes.

Key words: paranoid schizophrenia, language disorders, quantitative linguistic analysis

Introduction

Schizophrenia is often referred to by psychiatrists as a *royal disease* because of the wealth of symptoms that accompany it. The syndromes are so diverse and complex that until now there has been disagreement on how they should be classified (Hunca-Bednarska, 1997).

Most often (Bilikiewicz, Pużyński, Robakowski, & Wciórka, 2002) two basic sets of schizophrenia syndromes are distinguished: the positive and the negative. We can speak of positive syndromes when, beside normal behavior, other forms of behavior appear, such as evidence of emotional tension, motor excitement, delusional interpretation of events or hallucinations. On the other hand, we can

talk about negative syndromes when we deal with a lack or deficit of normal behavior of a given human being, such as emotional expressiveness and communicativeness or reacting to external events. All these symptoms go to make up the two types of schizophrenia described by N. Andreasen and T. Crow (1979, 1984):

I the positive type in which creative syndromes prevail: delusions, hallucination, formal thinking disorder and increase of activity, suspicion and self-assessment.

II the negative type in which deficit symptoms and significantly lower communicativity and activity are dominant.

This bidimensional clinical model has often been put to the test with the aid of specially designed tools, notably the PANSS scale (T*he Positive and Negative Syndrome Scale for Schizophrenia*) which has been used in the present work as an instrument to describe schizophrenia syndromes. Our assumption, in accordance with the holistic model of the human being, has been that each clinical syndrome typical of schizophrenia finds its reflection in language and that by analyzing the specific language disorder one can uncover the underlying basic syndromes. According to A. Czernikiewicz (2004), in modern psychiatry it is precisely language disorders that constitute, because of their accessibility, one of the basic diagnostic criteria whose correct assessment becomes one of the most essential components in the work of a psychologist or psychiatrist. Hence, in light of modern scientific thought, the ability to determine and measure language pathology in schizophrenia has become a very important task. If we manage to describe precisely the characteristic features of the language of psychotics, psychiatrists would gain a new and useful diagnostic tool and corresponding therapy, whereas patients would get the chance of rapid and professional help.

The problem of language disorders in schizophrenia is of interest to both practicing psychiatrists and language theorists. The relevant literature (Czernikiewicz, 1999, 2004) abounds in instances of typically schizophrenic dissociation, speech and content impoverishment, lack of logic, echolalia, a wealth of neologisms and perseverance. On the other hand, linguists (Woźniak, 2000, 2005) describe lack of syntactic, semantic and pragmatic coherence.

The division of language disorder symptoms into positive and negative ones, as postulated in the present work, aims at systematizing the schizoaphasia syndromes presented in the literature by linking them to a disease type and to clinical syndromes. Such an approach tries to reconcile the clinical and linguistic points of view which, in the relevant literature, are most often described as separate paradigms, showing that the human being is an entity and one cannot analyze linguistic processes independently of other psychic processes, including the disease. Psychiatry handbooks (Bilikiewicz, Pużyński, Robakowski, & Wciórka, 2002) clearly tend to link language disorder to mental disorders. In the present approach we attempt to confront the typically schizophrenic language changes (Czernikiewicz, 2004) with the typical clinical syndromes based on the PANSS scale, thus showing that the

Table 1. The correspondence of clinical and language syndromes

Clinical syndrome	Typical language change
POSITIVE SYNDROMES	
Delusions	Overrepresentation of abstract and metaphysical termini or verbal abuse of death, power and hostility themes that have to do with the schizophrenic vision of the world.
Hyperactivity	Verbosity: utterances are long, loud, emphatic, difficult to break into, overloaded with details
Formal mental disorders	Sentences are incomplete, agrammatical, incoherent texts within a single utterance
Suspicion and hostility	Numerous nouns to express aggressions and mistrust
NEGATIVE SYNDROMES	
Lack of speech spontaneity and fluency	Incoherence and disfluency of utterances showing – among other things - rare conjunctivity and anaphoric and idiosyncratic pauses
Autism and emotional retreat	Numerous neologisms and perseverance; rare use of group pronouns and animate nouns; very poor use of adjectives, especially emotive ones, which makes the utterances sound "cool and colorless".
Sterotypic thinking	Impoverished speech and content, word repetitions, decrease of complex sentences in favor of a greater number of simple ones.
Disorder in abstract thinking	Seldom use of abstract nouns and complex grammatical forms.

essence of schizophrenia is reflected in the language. It is assumed here that the specific positive clinical syndromes correspond with the specific positive language disorders and, analogically, the clinical negative syndromes correspond with the negative syndromes on the language level, as shown in Table 1.

Thus one can put forward a hypothesis, different from that found in Andreasen (1979) for whom the majority of language pathology symptoms goes to make up an integral part of the positive schizophrenia syndrome, about a correlation between the negative and positive clinical symptoms and corresponding specific language symptoms.

Research method

14 hospitalized psychiatric patients suffering from paranoid schizophrenia took part in the research. The research was carried out in the District Hospital

for the Neurally and Psychiatrically Diseased in Gniezno. On the basis of the opinion of the physician in charge and the PANSS scale, the subjects were divided into two groups: the positive type of schizophrenia and the negative one. Each patient was informed about the aim of the research and agreed in writing to partake in the investigation and to have his spoken utterances recorded on a dictaphone. Later on, a patient was shown one by one three TAT test tables of diverse level of complexity and asked to describe what he was able to see in them. The pictures had been selected in such a way that they were supposed to be more or less realistic and varied in the level of complexity (the multitude of planes, the number of objects, the dynamics of their presentation). A similar procedure was applied to the control group of healthy people. The control and research groups were matched for sex, age and education; the only variable was the status of the disease.

The spoken texts were transcribed and formatted for further computer processing. Words have been marked with morphological information including the root and the grammatical category. The following set of grammatical categories was ascribed to words: noun, nominal pronoun, verbal noun, verb, the lexeme BYĆ (= to be), adjective, passive participle, active participle, past participle, adjectival pronoun, adjectival numeral, adverb, past perfect participle, present participle, adverbial pronoun, preposition, conjunction, exclamation, call, onomatopoeia, particle, cardinal numeral, mass numeral, partitive numeral, ordinal numeral.

The texts were analyzed with a set of UAM Text Tools (Obrębski & Stolarski, 2006) worked out at the Department of Mathematics and Informatics of the Adam Mickiewicz University and with programs written specifically for that purpose.The part that had to be dealt with by hand included the disambiguation of morphosyntactic markers and the marking of the syntactic function of some words (e.g. conjunctions).

Results

The research has partly confirmed the hypotheses formulated earlier. Some of the obtained results are:

1) **Total length of utterances measured by the number of words**. The mean length of utterances produced by patients with negative symptoms (201 words[1]) is only slightly lower than that of those produced by healthy people (288 words[2]); the patients with positive symptoms produced utterances several times longer (1491 words on average[3]).

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[1] words in individual utterances: 81, 78, 265, 144, 930, 133, 86, 78 , 12.

[2] words in individual utterances: 216, 358, 120, 622, 144, 464, 218, 380, 471, 113, 161, 48, 198, 321.

[3] words in individual utterances: 4846, 244, 713, 1201, 355.

Figure 1. The percentage rate of words representing the particular grammatical category
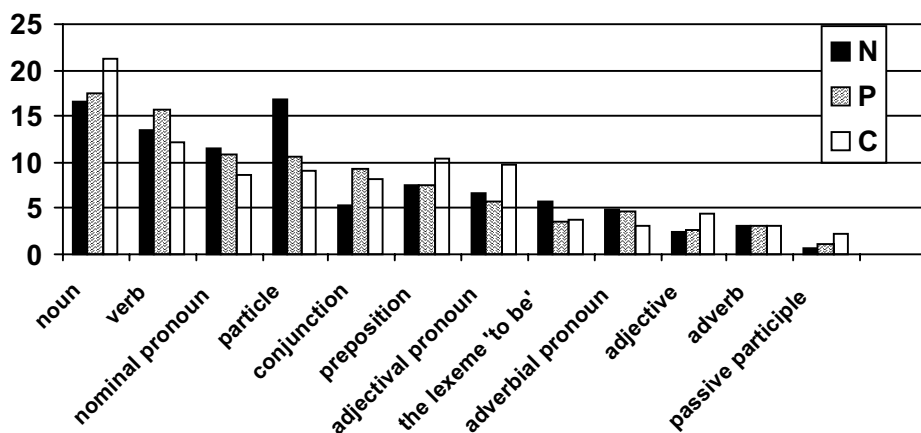
2) **The percentage rate of words representing the particular grammatical category**. Figure 1 shows the percentage rate of words representing a particular grammatical category in the utterances of patients with negative symptoms (N), patients with positive symptoms (P) and in those of healthy people (C) (only categories with the highest percentage rate were considered). We noted that:
   – in the patients' utterances fewer nouns were used – 16,5% (patients with negative symptoms) and 17,4% (patients with positive symptoms) – than in those in the control group – 21,2%.
   – the patients more often use verbs: 13,6% (patients with negative symptoms) and 15,6% (patients with positive symptoms) on average against the mean 12,1% in the control group; it is worth noticing the difference between the patients with positive symptoms and those with the negative;
   – there are differences in the ratio of the basic nominal components (nouns and nominal pronouns) to the verbal ones (verbs and the lexeme *być* 'to be'): in the control group it is expressed by the coefficient 1.9, whereas in both patient groups it amounts to 1.5.
   – the patients' utterances included only about half as many adjectives as those in the control group; in this respect no difference has been noted between the diseased with positive symptoms and those with negative ones; the frequency of the use of participles is similar.
3) **Verbs**. Verbs were analyzed with respect to the particular inflection forms: in the patients' utterances verbs in the 1st person tend to occur more often (positive patients – 27.4%, negative patients – 19.6%, control group –

15.3%). Thus difference is particularly noticeable in the case of patients with positive symptoms. The use of plural forms remains in all three groups on a similar level (positive patients – 10.1%, negative ones – 9.6%, control group – 11.2%).

4) **Nouns**. Nouns were analyzed with respect to the frequency of abstract and metaphysical ones. (These are nouns like god, faith or satan).

   a) **Abstract nouns**. The use of abstract nouns is on a similar level in the control group and in the group of patients with positive symptoms (30% and 34% respectively, in relation to the number of all nouns). Results significantly differ in the group of patients with negative symptoms, where the use of abstract nouns was considerably lower, a total of 20% of all nouns.

   b) **Metaphysical nouns**. The use of nouns with metaphysical meaning was the highest in the group of patients with positive symptoms (3.4% of all nouns), lower in the group with negative symptoms (2.4%) and the lowest in the control group (1.2%). It should be noted that only three utterances affected this higher percentage rate: one from a positive patient (15%) and two from two negative patients (17% and 5%). The utterances of other patients included from 0% to 1% metaphysical nouns.

5) **Personal pronouns**. There is a higher rate of the use of the pronoun *ja* in the group with positive symptoms (2,16%) in relation to the two other groups (1,15% and 1,08%). Differences show up in the use of pronouns in the third person as well (see point 6).

6) **Referential pronouns**. The use of referential pronouns is lower in the patients' group than in the control one. In the case of the personal nouns (*on* 'he', *ona* 'she', *ono* 'it', *oni* 'they', *one* 'they'), they constituted 0,86% of all words in the group of patients with positive patients, 1.05% in the group with negative symptoms, whereas in the control group the percentage amounted to 1.35%. The difference was particularly visible in the case of adjectival pronouns (*jego* 'his', *jej* 'her', *ich* 'their') which practically were absent in the speech of the diseased (only one instance of use was noted), whereas in the control group they constituted 0,4% of all words.

7) **Relative pronouns**. The frequency of use of the word forms of *który* 'which' and *co* 'what'/'which', lexemes which function as relative pronouns, has been measured (the number corresponds to the frequency of occurrence of relative sentences in utterances). The relative pronouns are fewer in the speech of the patients compared to the control group, in which they totaled 0.79% of all words; in the case of patients with positive symptoms, the percentage amounted to 0.61%, while with those with negative symptoms as little as 0.31%.

8) **Conjunctions** *bo* **'because',** *ponieważ* **'since, as',** *i* **'and'**. The use rate of the conjunction *bo, ponieważ* is significantly higher in the patients' utterances. Compared to the control group, where they constituted 0.29% of all words, the patients with negative symptoms would use them twice as often (0.59%) and the ones with positive symptoms five times more often (1.57%). The patients' speech includes more occurances of the conjunction *a* 'and' (indicating contrast) (the negative patients – 2.24%, the positive ones – 1.35%, the control group – 0.79% The use of the linking conjunction *i* 'and' in all three groups were on a similar level (2.5-2.9%). Note that those conjunctions are very often used, especially by the patients, not as a linking element, but in the function of what T. Woźniak (2000) called a quasi-conjunction operator, a supporting element in constructing a spoken text.

9) **Word repetition**. The frequency of repetition of a given word (the inflection form was the measure of accuracy) in an utterance was examined. The context of 3 to 70 preceding words was considered. The repetitions that occurred immediately before it, e.g., those resulting from stuttering or pauses before the subsequent part of the utterance was produced, were ignored.

The results are shown in Figures 2, 3, and 4.
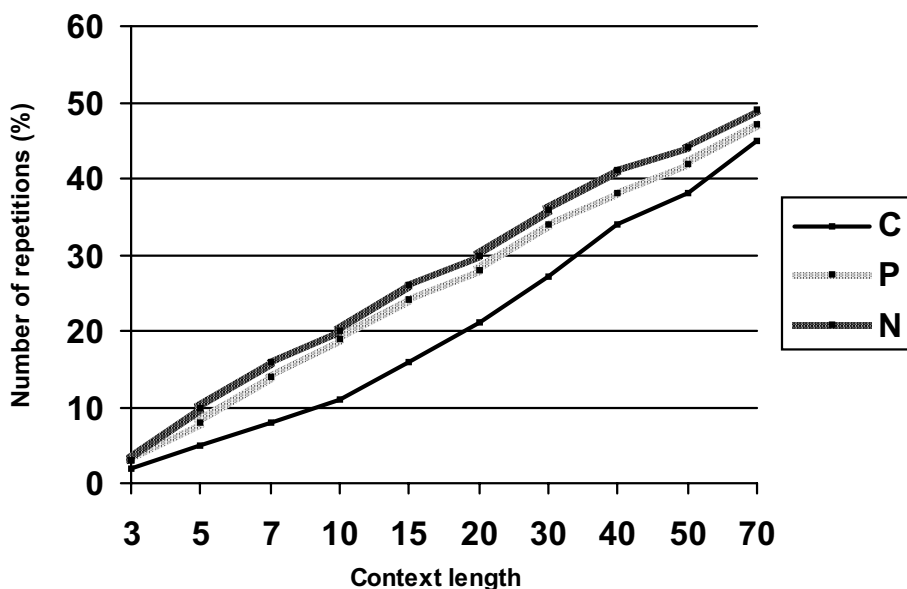
Figure 2. Word repetition
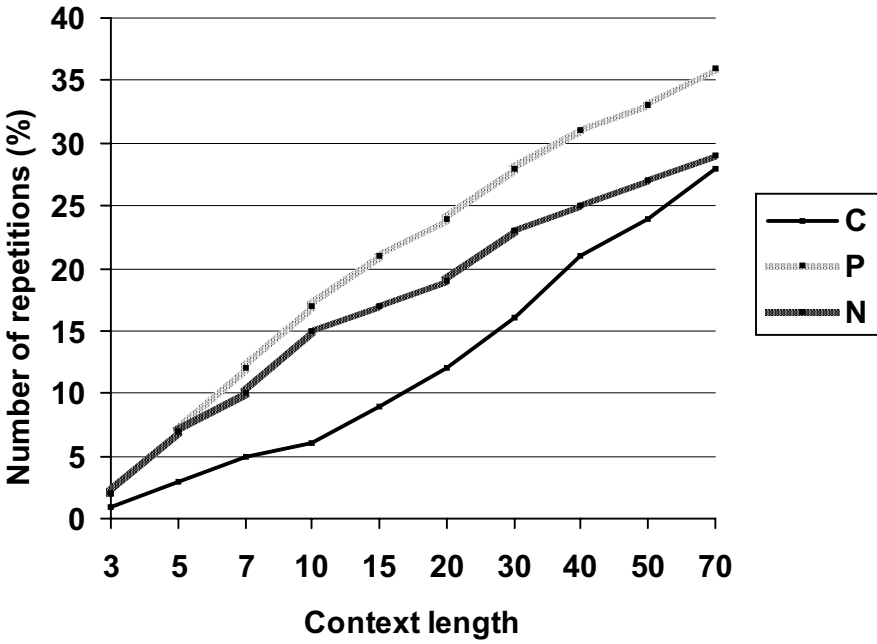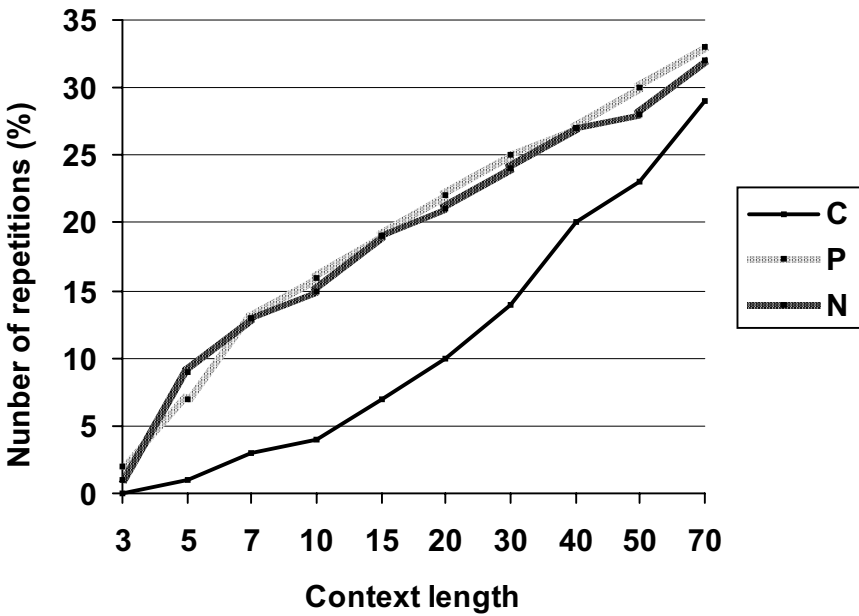
Figure 3. Noun repetition

Figure 4. Verb repetition

The results in the patients' group differ from those in the control group. The biggest difference can be observed for the 7-14 preceding words. The differences become even more noticeable when we focus on nouns and verbs. Word repetitions in those categories occur in the speech of schizophrenic patients three times more often than with healthy people. The results in both patients' groups are similar.

The results obtained on such a small sample do not provide sufficient grounds to formulate conclusions of scientific value. Nevertheless, in many areas one can see that a result in one patients' group significantly differs from the reference point determined by the result in the control group, while the result in the other one approaches that obtained in the group of healthy people. These areas required more profound investigation.

To sum up, one is inclined to accept the thesis of the specific nature of the schizophrenic patients with positive and negative syndromes. The utterances of patients with positive syndromes were clearly the longest, the metaphysical terms were overrepresented, there were a greater number of verbs in the first person and pronouns *ja* 'I'. The negative patients seldom used relative pronouns, and their utterances were short and lexically less abstract. All the diseased produced significantly fewer adjectives and slightly fewer nouns than healthy people (they used more verbs), their utterances were characterized by frequent repetitions and their referencing was scarce. These conclusions are encouraging enough to expand the hypotheses and carry out further research on a larger sample.

The small amount of obtained language material does not enable us to verify precisely the hypotheses presented in Figure 1. The qualitative analysis of utterances of individual patients indicates that positive verification might be possible. For instance, in the speech of Patient no. 1 with clearly delusional thinking, who had been assigned to the group with positive syndrome, we recorded 15 % metaphysical nouns (e.g., *bóg* 'god', *wiara* 'faith', *szatan* 'satan') and 32% abstract nouns (e.g., *los* 'destiny', *głos* 'voice', *intonacja* 'intonation'). This confirms the thesis on overrepresentation of metaphysical terms with patients suffering from delusion. Another hypothesis concerns a considerable adjective deficit in the speech of autistic and emotionally withdrawn patients (the negative group). Patient no.4 was just the patient, in whose utterances we were not able to find any adjective nor participle. These results are encouraging enough to continue research on a larger sample which might confirm their accuracy.

References

Andreasen, N. (1984). *Scale for the Assessment of Negative Syndromes (SAPS).* Iowa City: University of Iowa.

Andreasen, N. (1984). *Scale for the Assessment of Positive Syndromes (SAPS).* Iowa City: University of Iowa.

Andreasen, N. (1979). Thought, language and communication disorders. Clinical assessment, definition of terms and evaluation of their reliability. *Archives of General Psychiatry*, 36, 1315-1321.

Bilikiewicz, A., Pużyński, S., Rybakowski, J., & Wciórka, J. (Eds.) (2002). *Psychiatria* (Psychiatry). Vol. II. Wrocław: Wydawnictwo Medyczne Urban & Partner.

Czernikiewicz, A. (1999). *Językowy wymiar przewlekłej schizofrenii* (Language dimension of chronic schizophrenia). Lublin: Wydawnictwo AM.

Czernikiewicz, A. (2004). *Przewodnik po zaburzeniach językowych w schizofrenii* (A guide to language disorders in schizophrenia). Warszawa: Wydawnictwo Instytutu Psychiatrii i Neurologii.

Hunca-Bednarska, A. (1997). *Skojarzenia werbalne w schizofrenii* (Verbal associations in schizophrenia). Lublin: Wydawnictwo Czelej.

Kępiński, A. (1981). *Schizofrenia* (Schizophrenia). Warszawa: PZWL.

Obrębski, T., Stolarski, M. (2006). UAM Text Tools – A Flexible NLP Architecture. In: N. Calzolari (Ed.), *Fifth International Conference on Language Resources and Evaluation, Genoa, Italy, 24-26.05.2006. Proceedings* (pp. 2259-2262). Paris: ELRA.

Woźniak, T. (2000). *Zaburzenia języka w schizofrenii* (Language disorders in schizophrenia). Lublin: Wydawnictwo UMCS.

Woźniak, T. (2005). *Narracja w schizofrenii* (Narrative in schizophrenia). Lublin: Wydawnictwo UMCS.