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An analysis of language disorders and selected cognitive functions among schizophrenia sufferers

SUMMARY

The study was conducted on patients diagnosed with schizophrenia. It is concerned with the analysis of speech disorders (referred to as schizophasia in this experimental group) and selected cognitive functions.

The study is divided into two parts. The first one contains conversations with patients on topics relating to their most immediate environment. They served as a basis for the evaluation of two aspects: linguistic phenomena according to N. Andreasen's The Scale for the Assessment of Thought, Language and Communication, as well as grammatical, semantic and syntactic disorders according to A. Czernikiewicz's Krótka Skala Oceny Schizofazji [Short Scale of Schizophasia Evaluation]. The second part is concerned with the assessment of the functioning of selected cognitive processes, i.e. semantic fluency and short-term memory.

The results obtained have been divided into quantitative and qualitative analyses. The quantitative analysis of the first part has demonstrated that the most frequent linguistic phenomena among patients with schizophasia are: excessive attention to detail, digressiveness, illogicality. Apart from that, patients had the greatest difficulties with pragmatic coherence of their utterances (90% of the sampled patients). The study of selected cognitive functions has demonstrated that patients diagnosed with schizophrenia fared worse in semantic fluency and short-term memory tests. However, it is the qualitative analysis that turned out to be the most interesting element of the study. It identified some interesting phenomena in cognitive functions, which cannot be found in the control group. They are connected with excessive abstraction, specific parts of speech, neologisms, numerous perseverations, interjecting loose associations and changing the plot of a story.

There is a relation between the appearance of some linguistic phenomena and the results of cognitive functions tests carried out on the experimental group. Although the general correlation between these two aspects is not high enough to be considered statistically relevant, in the most severe cases, the appearance of linguistic phenomena during the testing of cognitive functions proves that schizophasia-type disorders considerably affect semantic fluency and short-term memory.

Key words: schizophrenia, schizophasia, speech disorders, semantics fluency, short-term memory

INTRODUCTION

The specificity of language used by people suffering from schizophrenia and disorders of their cognitive functions, especially the overlapping of the two phenomena, poses an interesting issue. At the same time, it is a topic not researched profoundly and an attempt at providing an answer to a question pertaining to its small fragment brings further doubts, which in turn encourages further research. The study below presents three aspects related to schizophrenia.

The first of them pertains to schizophasia as specific language disorders in people suffering from schizophrenia. Basing on the already-existing scales for the evaluation of language phenomena and a qualitative analysis, the most frequent communication problems of schizophrenic patients have been analysed and their most spectacular utterances quoted. Apart from that, schizophasia will be presented in the aspect of all language levels, i.e. phonetic, semantic, syntactic and pragmatic.

Selected cognitive functions in schizophrenia sufferers were another subject of the study. Tests were chosen in such a way so that the analysed functions would be closely related to the spoken language. Additionally, specific aspects of the disorders which appear only in this group of patients will be presented.

The last stage amounts to the comparison of and the attempt to correlate language disorders and cognitive functions. This turned out to be the most difficult aspect to prove in terms of statistics. However, having taken into consideration the results of the qualitative analysis, based on a detailed demonstration of specific aspects of both language disorders and cognitive dysfunctions, this interdependence became more apparent.

THE DEFINITION OF SCHIZOPHASIA

Schizophasia is a complex of language disorders in schizophrenia, clinically manifested as a range of derailment and poverty of content of speech phenomena, which is a clinical equivalent of discourse cohesion disorders and poverty of sentence syntax (Czernikiewicz 2008). The term should be connected, above all, with the loss of discourse cohesion in its aspects of grammar, semantics and pragmatics (Woźniak 2005). It leads to inter-level dissolution, which involves the disappearance of the highest functions (related to the frontal lobes) and uncovering the activity of the lower brain level (the level of prelogical activity). Comparing the above-mentioned theory with the theory of the evolution of language in the process of ontogenesis and taking into account the most frequent language phenomena in schizophrenia, where the most frequent ones are the symptoms of disintegration on the level of discourse, the less frequent – on the sentence level

and the least frequent – on the level of words, an obvious conclusion presents itself that in schizophrenia we are dealing with symptoms of the dissolution of the language system (Czernikiewicz, Woźniak 2012).

SUBJECTS

People subjected to the study were patients suffering from schizophrenia. The research group (N=30, 12 women and 18 men) included patients of two secure wards and one outpatient ward. The secure wards were: Developmental Psychology, Psychotic Disorders and Advanced Age Ward of the Tadeusz Bilikiewicz Province Psychiatric Hospital in Gdańsk and the Clinic of Mental Illnesses and Neurotic Disorders at the Academic Clinical Centre in Gdańsk. The Outpatient Ward is also a division of the Tadeusz Bilikiewicz Province Psychiatric Hospital in Gdańsk.

The subjects are women and men aged between 18 and 60. The average age of the patients is 43.1 years, whereas the standard deviation amounts to $SD=12.75$. The research group was diverse in terms of the type of schizophrenia and the number of hospital stays due to the illness. All the patients subjected to the study were on a stabilized stage of the illness. The study excluded patients with aphasia (owing to the similarity of symptoms). All examined patients were in the course of psychological therapies conducted by psychotherapists from the above-mentioned hospitals.

METHODS

The study I conducted is comprised of two parts. The first one is a conversation with each of the patients about their closest environment. On its basis, language phenomena were verified based on the “Scale for the Assessment of Thought, Language and Communication” – TLC (Andreasen 1980), the disorders in terms of grammar, semantics and syntax according to the “Short Evaluation Scale of Schizophrenia” – SESS (Czernikiewicz 2004) and also other specific language disorders. The conversation included the following questions:

- Where do you come from?
- What do you do for a living?
- Could you describe a person dear to you? (Czernikiewicz 2004)
- What are your childhood memories? (Czernikiewicz 2004)
- In your opinion, what are the products worth eating in order to stay healthy?

When a subject was answering questions eagerly and extensively (often deviating from the topic), I allowed him or her to speak in full without interrupting

the patient. However, if a subject gave short or even one-word answers, I asked more detailed questions.

The second part of the study related to testing the functioning of cognitive processes. The tasks had been slightly modified from the Newcombe Fluency Test, that is the Semantic Fluency Test. In my study the tasks for the people with schizophrenia included:

- listing names of animals,
- naming words beginning with the /m/ sound.

The subjects received instructions that one minute is assigned for every task and that they should name as many words in a given category as possible.

Another task, testing short-term memory, included naming fifteen pictures in a row and then saying as many of them as possible from memory. The subjects named each picture twice to memorize them. The list below presents the items shown in the pictures for the patients to memorize:

- clock
- bed
- gloves
- cherries
- carrot
- strawberries
- cucumber
- kettle
- knife
- grater
- coat
- couch
- spoon
- pot
- ring

The illustrations were taken from a speech therapy aid “Od obrazka do słowa” by H. Rodak and D. Nawrocka. The pictures were selected in such a way so as to illustrate everyday objects. Some of the objects are used for a similar purpose, e.g. a spoon and a knife, a pot and a kettle. Some of the names of the pictures resemble other names phonetically e.g. a spoon – a bed, a coat – a couch¹.

QUANTITATIVE ANALYSIS

Language phenomena analysis based on the TLC scale

¹ In their Polish original each of the example pairs of words begins with the same sound (translator’s note).

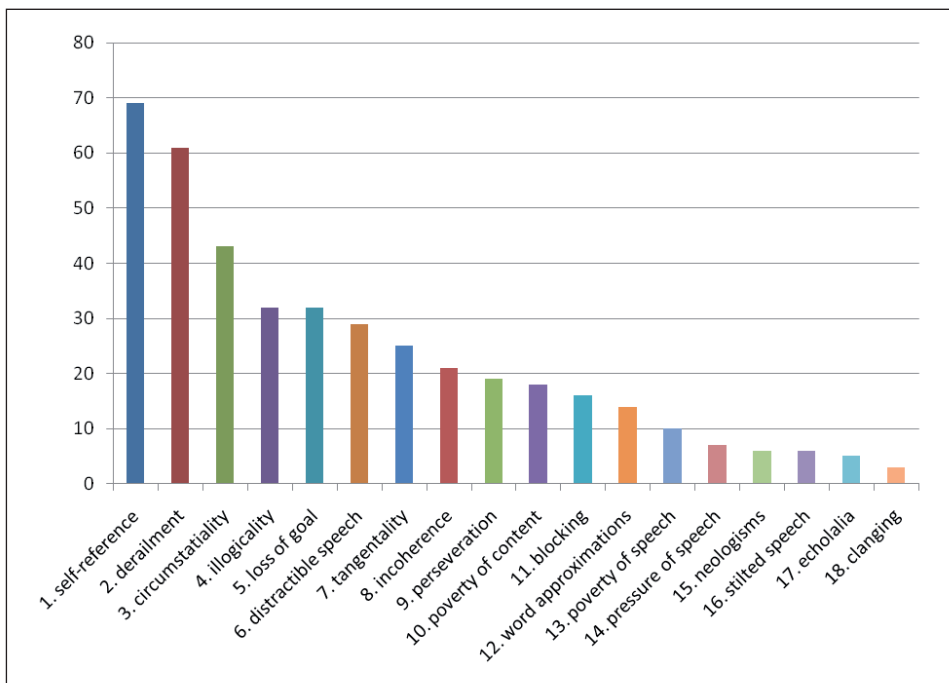


Diagram 1. The sum of scores of language phenomena according to the TLC scale

The Scale for the Assessment of Thought, Language and Communication (TLC) is comprised of 18 language phenomena constituting elements of schizophrenia. The assessment criteria range from 0 to 4 points in the case of the first eight phenomena and from 0 to 3 points in the case of the ten final disorders (see: the TLC scale). Based on the scale, the average result for the patients I examined is: 13.87 points. The standard deviation from the average result amounts to: $SD=5.64$. I prepared the quantitative analysis based on the prevalence of individual language disorders. The results are presented on a Diagram above:

Diagram 1 includes the sums of scores of individual language phenomena of all the participants of the study. The quantitative results indicate that the most frequent language, thought and communication disorders are: self-reference and derailment. Both phenomena scored a total of more than 60 points among the patients. Moreover, circumstantiality, illogicality and loss of goal disorders were quite frequent (more than 30 points). Clanging, echolalia, stilted speech, neologisms and pressure of speech appeared among the examined patients only in individual cases, which the totals of less than 10 points show. However, it is worth noticing that in my study every phenomena mentioned by Andreasen appeared at least once.

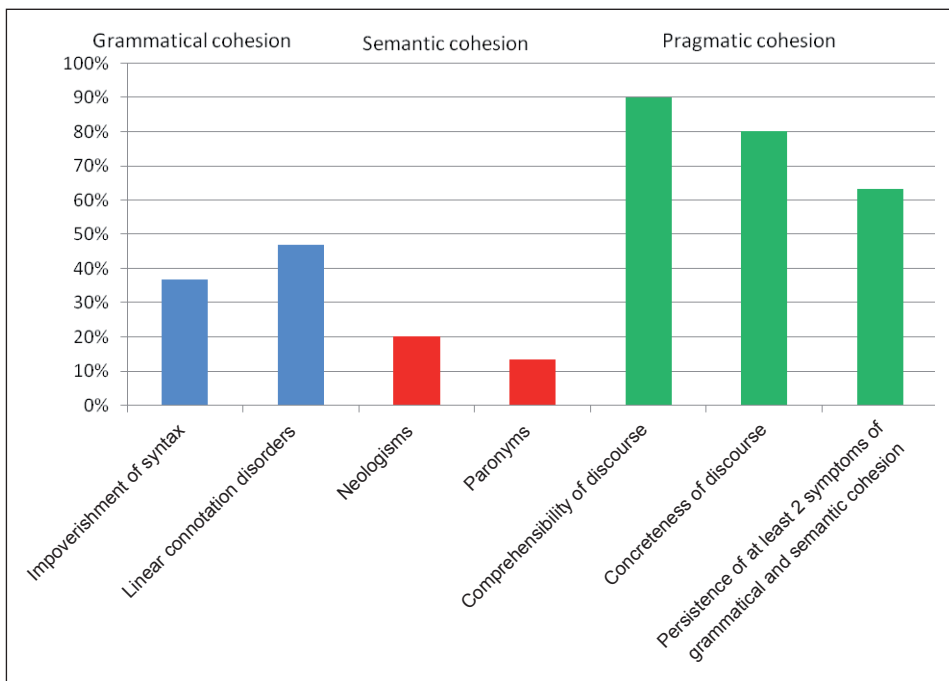


Diagram 2. Average scores of language phenomena according to SESS

Language phenomena analysis based on SESS

The Short Evaluation Scale of Schizophrenia (SESS) emphasizes the aspects of grammatical, semantic and pragmatic cohesion in a patient's utterance. Based on that it is possible to diagnose schizophrenia accurately and to determine its severity. 70% of the patients I examined (21 people) scored 7 or more points, which indicated severe schizophrenia, whereas 30% (9 people) were qualified as people suffering from mild schizophrenia. The Short Evaluation Scale of Schizophrenia assumes different values for the evaluated types of language cohesion. For phenomena related to grammatical cohesion a patient is given 1 point, semantic cohesion disorders equal 2 points, whereas pragmatic cohesion disorders – 3 points. To present the study results in a more objective manner I gave the average values for every type of cohesion disorder. The detailed study results in this respect are presented on the Diagram above.

Diagram 2 demonstrates that patients experienced the biggest difficulties in terms of pragmatic cohesion – as many as 90% of the subjects showed a symptom in the aspect of the comprehensibility of discourse, which means that the patients referred to their hallucinations, deviated from the topic or spoke inappropriately to the situation. Also the concreteness of discourse of schizophrenia patients is

considerably disturbed (80%). Both aspects of grammatical cohesion disorder appeared in about 40% of patients. The least frequently occurring disorders I observed were the semantic cohesion ones – only every fifth patient displayed a tendency towards creating neologisms and even fewer patients' utterances (12%) were characterized by the presence of paronyms. The disturbed grammatical and semantic cohesion translated into pragmatic disorders as at least two symptoms of these phenomena persisted in 63% of patients.

The above-mentioned results correspond to the results of language disorders on the TLC scale. The most frequent language phenomena according to Andreasen's scale – Self-Reference, Derailment and Circumstantiality are related to language pragmatics, that is the area which, according to the SESS results, is the most problematic one for people with schizophasia. Also the prevalence of neologisms according to SESS reflects the total of neologisms and verbal approximations according to TLC. Paronyms (SESS) mirror the phenomenon of clanging (TLC). Their frequency corresponds as well – the total of 4 points according to TLC is the equivalent of 13% of SESS semantic cohesion disorders. In the case of grammatical cohesion the correlation is more complex. The impoverishment of syntax was treated by the authors as an advantage of single clauses over complex sentences, the usage of elliptical sentences and sequences of automated words. Such symptoms may be indisputably recognized to be equivalent to the poverty of speech phenomenon according to TLC, as the poverty of speech relates to reducing a discourse in terms of the number of words and information conveyed, which does not translate directly into the structure of a grammatical utterance. Whereas the linear connotation disorders reflect untypical word connections. Such a definition is in line with the incoherence phenomenon as a random choice of words. Nevertheless, incoherence pertains to breaching connections between clauses, which considerably broadens the range of this phenomenon's application.

ANALYSIS OF COGNITIVE FUNCTIONS RESULTS

The cognitive functions I examined in people with schizophrenia were based on a semantic fluency test and a picture-memorizing test which analysed recent memory.

Analysis of the semantic fluency test

Statistical results of the subjects of the semantic fluency test are presented in Table 1:

Table 1. The results of the semantic fluency test among people with schizophrenia

	Average \bar{x}	Standard deviation SD	Highest value n_{max}	Lowest value n_{min}	Correlation r_{xy}
Listing names of animals (X)	13.03	6.1	27	4	0.51
Naming words beginning with the letter "m" (Y)	10	5.17	20	2	

The results presented in Table 1 show that the patients dealt better with listing names of animals than with naming words beginning with the letter "m". It is indicated by a higher average value of listing animal names and greater highest and lowest values in this part of the task. The value of the standard deviation in both cases is similar, which proves that the results of both the first and the second element of the examination depart from the average to a similar extent. However, the correlation value testifies only to a moderate co-occurrence of approximated values in listing animal names and naming words beginning with "m". These results give evidence that people suffering from schizophrenia scored lower than the members of the control group where the subjects were able to provide at least 15 to 20 examples in both parts of the examination.

The objective of verifying of hypothesis 3 is an analysis of co-occurrence of cognitive functions values (based on the fluency test) and language disorders on the basis of the TLC scale. The correlation amounts to $r_{xy} = -0.18$. The diagram below shows the detailed co-occurrence distribution:

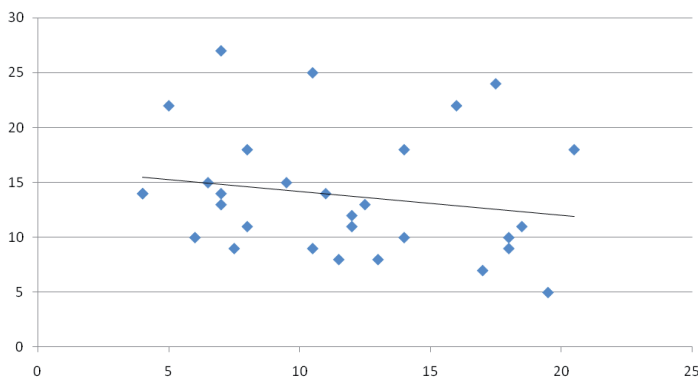


Diagram 3. The correlation of language disorders (based on TLC) and values of cognitive functions (based on the fluency test)

values x – fluency test results average
 values y – number of points according to TLC

Diagram 3 above indicates a large dispersion of results. The negative correlation ($r_{xy} = -0.18$) proves it a possibility to state that there is a certain tendency in schizophrenia sufferers that higher values on the language disorder scale co-occur with lower values in cognitive tests. This correlation is too low, however, to arrive at such a conclusion in an indisputable way.

Analysis of the picture-memorizing task

The results of the examination connected to memorizing pictures is presented in the Table below:

Table 2. The results of the picture-memorizing task of schizophrenia patients

Number of all pictures	Average \bar{x}	Standard deviation SD	Highest value n_{\max}	Lowest value n_{\min}
15	8.07	2.36	12	3

The results presented in Table 2 show that on average the patients remembered slightly more than a half of the pictures they were shown – value 8.07. The difference between the highest and the lowest number of pictures memorized by the subjects is a considerable one – it amounts to 9. Nevertheless, a small standard deviation (2.36) proves that the average number of memorized illustrations was not as varied.

QUALITATIVE ANALYSIS

This part will present an analysis of the most frequent and most interesting recordings together with examples of language phenomena on the basis of the TLC scale and SESS. It is worth emphasizing that in the transcripts of the recordings presented here different language phenomena occur simultaneously, e.g. apart from “self-reference” also “derailment”, “circumstantiality”, “perseveration” and “echolalia” appear in one utterance.

As I have already mentioned, the results of my study indicate that the most frequent language phenomena based on the TLC scale were “self-reference” and “derailment”. When asked about neutral matters, the patients very often referred to their own experiences, family problems or past events. In exceptional cases self-reference and derailment appeared even during the tasks testing the patients’

cognitive functions. I present the most interesting examples of the most frequent phenomena below (I have chosen utterances in which both disorders occur simultaneously):

Patient, female, 28 years old:

R: researcher

P: patient

R: Name products worth eating in order to stay healthy, in your opinion, please.

P: /oh then I don't know I can eat everything I don't know yyy what don't I like I don't like something I just can't remember what now I can't say just on the spot I can't recall but I don't like something yyy ah well I didn't use to like barley soup but now I like it a bit I changed my mind because once it was such that you couldn't eat it yyy but it's just very healthy so now I eat it yyy what else was there supposed to be something to eat yyy I can't remember I've forgotten I know there's something more for sure I've just forgotten yyy it's just that yyy what could there be more to eat that's good/

R: The question was: "what's worth eating to stay healthy?"

P: /what's worth eating to stay healthy then it was doctor (name of the lady doctor from the ward – author's note) she taught me thanks to her I lost twenty kilos 'cause well I mean well I used to be well first I was short and thin but later I started to eat a lot 'cause I think to myself geez my cousin I mean my aunt only that she's a year younger than me so it's funny she's my cousin so then I say that she just was I was the shortest in the family she was taller than me Kaška she's two metres right my aunt two or three years younger too my cousin I was the shortest but then I think to myself well no well here all the women are so tall or so right short thin nobody's well me about me doesn't want this I don't have any boyfriends and all of them they let them are taller than me fatter right well no you have to eat and I started eating and I grew twenty centimetres something and now I am one metre seventy-eight the most in puberty and I know exactly that if you eat a lot in puberty then you grow yeah and I just got and grew and already I'm the middle one I'm not the biggest the tallest anymore 'cause there's still Kaška she's two metres and I just think to myself oh no what have I done I used to be the shortest the thinnest I could've stayed that way and now I feel so stupid I mean I still saw people older than me that they are taller or whatever fatter but it wasn't the same I always used to be the shortest so (here: unintelligible fragment – author's note) well and that's all I can't remember at all what I don't like that's it yes I can't remember/.

The phenomenon of "circumstantiality" is also an interesting one. Most often it happened that the patients provided very detailed answers to a question about

their birth, origin and job. They would give detailed dates, administrative and even topographical data. I present a selected example of circumstantiality below:

Patient, male, 60 years old:

R: Where do you come from?

P: /where do I come from I was born some time ago seriously and I come well from Poland no really I'm not hiding from you that I'm some kind of Ukrainian or just whoever don't know no it's just that my parents met _ somewhere there near Mazovia _ because I don't even know where it was exactly _ father used to live in Warsaw and _ mom used to live somewhere there in the mountains in the Żywiec region _ and apart from that the borders of Poland were different before the war before thirty-nine and where Ukraine which is striving for independence is nowback then there used to be Poland still [...] I was born in the western lands previously recovered by the Germans that is the Szczecin Province and concretely Pырzyce district hospital there I came into this world _ in Pырzyce and later I lived there in two more places in Przemysław but first I was born in Brzeźno that is my place of birth and mom was taken to hospital in Pырzyce it was a district hospital and it was just there that I was born we lived in Brzeźno _ in Przemysław later _ there I dealt with grapes for the first time [...]/.

The characteristic feature of utterances of schizophrenia sufferers is perseveration. Among the patients I examined it appeared during the conversation or it was provoked by the cognitive functions test. Usually, perseveration referred to single words and constituted a sort of language fixation pertaining to a concrete word or phrase. Some patients reiterated “no” or “just” several times in a short conversation. Below I present examples of perseveration:

Patient, male, 49 years old:

/no just no no no no I don't know how to say that no that I wasn't afraid only anxiety was growing despite alcohol anxiety was growing that no no no no _ I was feeling unwell/.

Patient, female, 32 years old:

/but she's just so lively just energetic [...] but she just she's such a chatterbox just sometimes when she I mean I talk a lot too and she just talks a lot too sometimes I just I couldn't for example listen to her at all [...] but generally she's just a person who's just the closest to me[...] well just she just supports me in just any situation/.

As I have mentioned above, perseveration also appeared during the cognitive functions test. While naming animals, words beginning with “m” or names

of memorized pictures, patients repeated previously used words several times, for example:

Patient, female, 28 years old:

/watch watch bed watch _ watch bed _ watch bed _ watch bed _ watch bed _
couch cucumber strawberries cherries couch coat/.

Patient, male, 50 years old:

/mom my wife my wife my wife my wife and only my wife/
/tiger leopard zebra _ tiger leopard zebra _ lion _ crocodile _ snake goat sheep
ram bull cow bull sheep ram goat cow doggy kitty birdy/.

As the results of the TLC scale indicate, “verbal approximations” constituted a small percentage of the language phenomena. Nevertheless, they are ones of the most interesting disorders. I would get to know the meaning of a verbal approximation from its sentence context or I would ask the patient about it. Below I present examples of this phenomenon observed during the test:

- I’m twisting little butterflies in my hair – I’m bored
- it resulted in a clinic – the dog got ill
- I had an organism doctor – somatic diseases medical specialist
- vegetable knife – grater
- kids were in nappies – kids were small
- my expiry date is finishing – I’m running out of my disability pension
- I took a marriage – I got married
- I have to eat a diet – I have to be on a diet
- interpersonally – an interpersonal conversation

“Neologisms” are other interesting phenomena. I have not observed this type of phenomena while talking to the patients. Neologisms occurred exclusively during the fluency test. It turned out that the task of naming words beginning with the letter “m” provoked patients to produce words not motivated by the language system, as for example: despite how, *mafragility, *mess tir².

The phenomenon of “clanging” was also provoked when testing cognitive functions. Some of the patients listed animal names or words beginning with “m” based on the similarity of what they sound like. I present examples of clanging observed during the fluency test below:

- horse, elephant
- whale, camel
- unwillingly, despite how

² In Polish *machwiejność resembles the word “chwiejność” (which means “fragility”) with a syllable “ma” added in front of it. Whereas *merażka – looks like “menażka” (meaning a “mess tin”) with a mistake, i.e. a changed sound (translator’s note).

- mom, I've got, he had, I had, to have
- Miccio, to have, sword³

During the conversation (patients answering the questions asked) language disorders like clanging also appeared. However, I observed it only in one case. The patient, mentioning his origin said: /I frightened in Straszyn I mean I ended up in Straszyn/⁴.

Another intriguing feature of the language of schizophrenia sufferers is the tendency to list numbers. The discourses of some of the patients I examined were abundant with numbers as a result of excessive circumstantiality or the influence of hallucinations. In the case of the former the numbers mentioned referred to concrete events or those meaningful to the patients, for instance their date of birth, the number of hours worked or the amount of money earned:

Patient, female, 59 years old

/from the year fifty-eight to seventy-two up until June in May I fell ill _ up until June I was provided with education how many years fifty-eight sixty-eight ten fourteen yes and I fell ill on the fifth of May seventy-two when I got married in January on the twenty-ninth of January seventy-two I had not yet _ got married and I had been without the disease until the fifth of May/.

Patient, male, 50 years old

/the car which cost me three thousand and I sold it for five hundred zloty for scrap [...] I gave my cousin two hundred zloty back and I spent three hundred zloty on shopping a hundred and fifty-three zloty to be exact I spent I think or two hundred and fifty I can't remember exactly/.

As a result of hallucinations the numbers mentioned referred to the abstract transferred to the area of theories created by a patient, for instance:

Patient, male, 29 years old

/the gods were born some thousand years ago [...] I am zero to infinity apart from being the alpha of love science and war I also have something like zero to infinity [...] at this moment I am guarded by zero to infinity [...] one to infinity lived in the first species, we are the second one before the first species there were little vampires the second and the first race _ that is the first race the second race little vampires [...] the redhead one is a thirty-percent mind [...] it was an organism that was in fifteen hundred one hundred year AD it was thrown into a dungeon [...] three five seven sometimes tens nines eights twelves fiftenseightens at the

³ In Polish the first example pair rhymes and the remaining examples start with the same sound.

⁴ In Polish the town name "Straszyn" resembles the verb "straszyć" which means "to frighten".

most occur in America there also live twenty-four-percent minds too [...] and we ordinary people have five percent each [...] in America six percent four percent two percent and here there is three five seven although even eight-percent minds occur here in Europe [...] and I have one but to infinity _ first I had a three-percent mind made from the top and then a five-percent mind from the bottom [...] in Poland we already have seven fifteen-percent minds they are the so-called madmen cones in general everything is mathematics [...] there is one to infinity and two to infinity and sometime in the future there will be three to infinity but a family is not yet strong enough to create three to infinity [...] a construction worker has five thousand percent of the mind it isn't it wasn't made on the planet [...] this construction worker has ten thousand such agents [...] he works twelve fourteen sixteen hours a day [...] a black panther is the only woman who has a one percent mind to infinity in our species well because there are such digits as one to infinity two to infinity and there is also there isn't nothing to infinity that is zero and sometime in the future there will be three to infinity scientists will arrive at this too/.

Some of the schizophrenia patients I examined, while under the influence of their hallucinations, were certain they were outstanding individuals, which they disclosed in the conversation. In their hallucinations their extraordinary character manifested itself by means of knowledge inaccessible to others, intelligence, acquaintance with an eminent person, descent and the good they have done for the world and the human kind. Among the patients' utterances there were also hallucinations related to persecution. Based on the patients' discourses one may notice that past events are the cause of such delusions. When speaking about them the patients mistake the past with the present, talking about facts from years ago and transferring them to the present times. Kępiński (1979) defines this feature as a time "storm" where, mainly during the acute state of the disease, the past mingles with the present in a turbulent way.

The study of cognitive functions also provided numerous interesting observations. As the quantitative analysis indicates, listing animal names was less difficult for the patients than naming words beginning with the letter "m". During the fluency test I observed that the patients' most frequent tendency was finishing listing names of animals or words beginning with "m" before the assigned minute elapsed. The majority of the patients wanted to end their utterance after listing a few words by saying: "that's it" or "that's all". Similar phrases appeared after finishing answers to questions asked in the first part of the test. In every such instance I encouraged the patients to continue listing words appropriate for the question in such a way so as not to repeat the wording of the task. I informed the patients that there was still some time left and that they might remember something more. When encouraged, most patients focused on the task once more.

When listing animal names, the patients usually mentioned mammals. In the case of other species they named them and then remembered examples belonging to a given species. Below I present a transcript of a patient's utterance demonstrating both of the tendencies described above at the same time:

Patient, male, 60 years old:

/tiger lion dog cat camel giraffe zebra _ monkeys there are different kinds _ for example at least one a chimpanzee it can be a chimpanzee wolf fox well maybe that's all (here the researcher encourages the patient to continue – author's note) well birds for example stork crane heron hawk eagle/.

A few times I observed that the patients named other species as animal names without providing details of concrete examples belonging to those species, for instance:

Patient, male, 42 years old:

/wolf roe deer sheep dog bird fish mouse cat lion tiger orang-utan chameleon dolphin whale camel pigeons/.

Another tendency shown by the patients I examined during the animal naming task was the lack of consistency in the usage of the singular and the plural. The patients usually named animals in the singular. Many patients used both numbers alternately, though, for example:

Patient, male, 31 years old:

/dog fish cat spiders earthworms moles birds hens pheasants squirrels rabbits roe deer stags wild boar wolf/.

Patient, female, 31 years old

/horse cow ox donkey ram lion roe deer dog cat fish no elephants giraffes dogs cats sheep rams geese don't belong to animals to birds wild boars panthers lynxes/.

From among the listed animals the patients chose those belonging to two main categories: those known from the farm and those living in the zoo. The majority of the patients mixed both categories and therefore their answers cannot be clearly classified, for instance:

Patient, male, 59 years old:

/kiwi geese hens camels kangaroos dogs cats horses cows monkeys snakes/.

Patient, male, 31 years old:

/cat lion tiger panther wild boar elephant giraffe rhino seal monkey pig cow dog bison horse hamster guinea pig/.

During the second part of the fluency test which comprised naming words beginning with “m” some patients were still naming animals beginning with this letter, for example:

Patient, male, 60 years old:

/monkeys mouflons mom mariner mussel/.

Mostly though the patients started listing words with the word “mom”. Names or other proper names beginning with the given letter appeared often, for instance:

Patient, male, 29 years old:

/Martin city Muslim mafragility Mizuno sword machete grave Mezo Malwina Martina Matthias marzipan small smaller minute/.⁵

Many of the people I examined named not only concrete nouns (for example: bowl, soap, microwave oven but also, and in some cases above all, abstract nouns (for example: love, miniature). To verify this phenomenon I established a control group (N=30). It turned out that the people from the control group mainly listed nouns denoting objects, sporadically they mentioned names and the least frequently – abstract nouns. Among schizophrenia sufferers the number of abstract nouns is much higher.

Moreover, actually exclusively among schizophrenia patients I noted words which were parts of speech other than nouns. During the test the subjects very often used adjectives, adverbs and verbs. What is interesting is that the verbs appeared not in their infinitive form but invariably in their conjugated forms – most often in the first person singular.

The above-mentioned ways of listing words beginning with “m” occurred in the case of different patients at the same time. For this reason, below I provide examples of recorded tests related to all the issues mentioned above:

Patient, male, 41 years old:

/mother love interpersonal relations that is interpersonally morality mechanics music museum miniature motherhood menopause speech love certificate manhood wisdom facial expressions/.

⁵ From here onwards it needs to be remembered that all the words quoted from the second part of the test in their original Polish form begin with the letter “m” even though their English equivalents may not (translator’s note).

Patient, male, 49 years old:

/mom step-mother manuscript mesalliance Methuselah teddy bear fly soap mausoleum/.

Patient, male, 53 years old:

/mesalliance Muslim⁶Muslimwoman Lenin's Mausoleum mosque mummy massacre monks moss Montreal canteen sewing machine machinist fresh pickled cucumber/.

Patient, female, 59 years old:

/mother love motherhood wisdom wise small poppy/.

Patient, female, 42 years old:

/love mom motherhood I have I'm passing unwillingly despite how I'm passing March dream step-mother tantalizing I had to have/.

Patient, male, 50 years old:

/muscles meat mussel teddy bear milk milkpreserves muscle poppy seagrass/.

Patient, female, 38 years old:

/mom wall wet painter massage microphone Mirabelle plums microphone bowl wet Mirek sea/.⁷

Patient, male, 38 years old:

/mom butterfly shoal a little meanness larch wise guy mummy mouflon mule apricot mummy map apricot/.

The next stage of the cognitive function examination was a test of memorizing twice named pictures. In this case patients also often repeated the words already uttered. A few of the subjects were guided by the resemblance of sound, that is they listed a sequence of phonetically similar words (for example: bed, spoon). It is interesting that the majority of the patients did not try to reconstruct the order of the previously named pictures. The order in which they listed them was random. It often happened that the first word was the first or the last repeated name of a picture – “clock” or “ring”. The pictures had been selected in such a way so that some of the objects belonged to a common category, for example: spoon and knife. A few of the patients made a mistake and mentioned

⁶ The Polish form of this word used by the patient is a grammatically incorrect form (translator's note).

⁷ Both instances of “wet” are used as an adverb here (translator's note).

a “fork”, which also belongs to the category of cutlery, or they added other new elements. Below I present examples of answers provided while listing the names of pictures:

Patient, female, 34 years old:

/bed bed teaspoon knife cucumber strawberry/.

Patient, female, 28 years old:

/watch bed watch bed watch bed watch bed watch bed couch cucumber strawberries cherries ring couch pot coat/.

Patient, male, 59 years old:

/jug carrot strawberries divan cherries ring carrot/.

Patient, male, 29 years old:

/cherries cucumber pot ring kettle knife spoon fork/.

DISCUSSION

On the basis of the Scale for the Assessment of Thought, Language and Communication (TLC) Czernikiewicz (2001) analysed the increase of language pathology in the period of acute psychosis and compared it to the results of the same patients before discharging them. This study demonstrated that as much as a half of the language phenomena included in the TLC scale occurs in over 50% of schizophrenia sufferers. The author observed that the most frequent language disorders in the acute stage were those related to language cohesion, i.e. the poverty of content of speech, tangentiality, derailment, illogicality and loss of goal (Czernikiewicz 2001). These conclusions partially overlap with the results of the tests I presented here (this pertains to: derailment, tangentiality and illogicality). According to the results of the patients I tested, the most common language phenomenon was self-reference. In Czernikiewicz’s results this kind of disorder is not classified so high. Whereas in the study from 2001 (Czernikiewicz) the frequently occurring poverty of content of speech was not confirmed in my study – this phenomenon scored a total of only 18 points.

In line with Docherty’s statement (2005) the disorders of the basic cognitive function, including constant focus and a sequence of skills, may exert a negative influence on an individual’s ability to produce speech in a cohesive way. The meaning of these disorders plays an essential role in the aspect of outlining and maintaining a discourse plan (Docherty 2005).

The theory that there is a connection between cognitive functions and discourse planning is confirmed also by the language phenomena of the TLC scale.

Analysing the diagnostic elements of the Andreasen's scale it is clearly visible that most language disorders are based on the aspect of planning and maintaining a discourse. For these elements are the equivalent of the pragmatic and syntactic level of discourse, whose components I specified to be: poverty of speech, poverty of content of speech, pressure of speech, incoherence, tangentiality, derailment, illogicality, circumstantiality, loss of goal, blocking, self-reference and stilted speech. It confirms the results of the tests I presented where the most frequently occurring language phenomena according to the TLC scale included the majority of the above-mentioned phenomena, i.e. self-reference, derailment, circumstantiality, illogicality and loss of goal. Whereas the disorders referring to the lower discourse levels – semantics and phonetics – constitute only less than 28% of all phenomena listed by Andreasen. Neologisms and word approximations are semantics-related, while the phenomena connected to phonetics are clanging, perseveration and echolalia. These rare types of phenomena occur much more seldom than the disorders related to pragmatics and syntax, which also finds confirmation in Czernikiewicz's study (1993, 2001). The author (using the phrase: lexical layer instead of semantics and phonetics level) goes as far as to state that neologisms and echolalia occur entirely coincidentally. In my tests I also observed disorders on the semantics and phonetics level extremely rarely. Neologisms, echolalia and clanging made for a small percentage of pragmatic and syntactic disorders.

It is also worth emphasizing that it is not possible to detach semantic and phonetic phenomena from the entire utterance as they considerably influence the way the uttered speech is received, thus disturbing the utterance also on the syntactic and pragmatic level. For that reason even these phenomena may be classified as disorders of the higher discourse levels (syntactic and pragmatic). This conclusion was used in creating the SESS scale where the persistence of at least two symptoms of grammatical and semantic cohesion affects the assessment of language pragmatics.

Apart from that the examination of patients who had suffered a stroke (Pačalska, MacQueen 2002) referring to dispragmatics and aprosody confirm the influence of the lower language structures on the meaning of pragmatics. The effect of the disorders of the semantic and phonological level on discourse pragmatics was diagnosed on the basis of written discourses of these patients. It turned out that on the segment plain of the texts of patients who had suffered a stroke there occurred sporadic changes of letters of different voicing: "p" – "b", "t" – "d" and "k" – "g". These patients also occasionally applied punctuation or did not use it entirely (Pačalska, MacQueen 2002).

On the basis of SESS, Czernikiewicz (2004a) also compared patients' discourses in view of simplifying sentence syntax and speech coherence in schizophrenia. The author analysed discourses rendered by the patients presenting a high level of language pathology with the discourses of patients who could formally

(from the clinical point of view) be deemed “normal”. The results of this study substantiate poverty of sentence syntax in people with schizophrenia. Apart from that, the effect of breaking coherence connections between schizophrenic discourses on the pragmatic and semantic level confirm schizophrenic disorders, thus being an inseparable element of diagnosing schizophrenia (Czernikiewicz 2004a). The above-mentioned studies are reflected among the patients I examined. The incorrectly constructed sentences translate into the disorders related to the poverty of syntax and linear connotation. However, special attention needs to be drawn to the data proving a larger semantic cohesion disorder and the prevalence of semantic mistakes (NSEM). The ratio of semantically not cohesive connections among discourses to the total number of connections among discourses may constitute a base for searching for the reason for patients’ chaotic discourses.

Docherty (2005) summed up the previous studies on the connection between cognitive abilities and speech disorders in schizophrenia patients. In 2001, Sledge and others (after: Docherty 2005) found only weak connections between cognitive abilities and structural speech disorders. The examinations I present here confirm the above conclusions. The (negative) correlation between speech disorders and the level of cognitive functions did not produce a statistically relevant result ($r_{xy} = -0.18$).

Czernikiewicz (2006) also studied selected cognitive functions in schizophrenia patients using the Łucki test – “A set of samples for the study of cognitive processes in patient with brain damage”. The author’s study results indicate essentially worse results in terms of verbal fluency and repetitiveness. Whereas no deficits were observed as far as naming was considered. In most cases, the tests I present here confirm the lack of naming disorders (during the picture-memorizing task the subjects named the illustrated objects twice). The only cases of this type of disorders were: contamination in one of the patients who named the “couch” on a picture a “moat”⁸ and a verbal approximation in a patient who named a grater a “vegetable knife”.

Czernikiewicz (2006) also analysed memory functions, based on which he observed statistically crucial differences to the disadvantage of the group of schizophrenia sufferers in the aspect of auditory short-term memory and visual long-term memory. Klasik, Krupka-Matuszczyk and Krysta (2005) add that schizophrenia sufferers’ lower scores in memory tests generally do not differ among patients with the first episode of schizophrenia and people with a long medical history of the disease. My study within the area of memorizing pictures validates these disorders.

⁸ i.e. the order of syllables was changed from Polish “sofa” (meaning “couch”) to “fosa” (meaning “moat”) (translator’s note).

Pąchalska's (2007) study of people who have suffered a brain injury partly confirmed the dependency between language disorders and cognitive functions based on a fluency test. Patients with mild or moderate symptoms of dementia due to the Alzheimer's disease (DAT – Dementia Alzheimer's Type) usually did not score below the norm. However, patients with semantic dementia and representing most fronto-temporal forms of dementia almost invariably showed difficulties with naming more than a few words during the tests. Pąchalska's studies conducted among people with injuries of the right hemisphere also indicate a clearly smaller number of such names in comparison to healthy individuals (Pąchalska, 2007).

CONCLUSIONS

The presented tests of language disorders and cognitive functions in people suffering from schizophrenia illustrated to a great extent the specificity of this disease in the linguistic and neurolinguistic aspect. I present the crucial conclusions related to the phenomenon of schizophasia and its cognitive implications below.

Based on the results on the TLC scale one may claim that an average person suffering from schizophrenia derails from the topic of the discourse, most often by referring the discussed topic to himself or herself. During the conversation such a person mentions a lot of details, owing to which his or her answers to the simplest of questions may last very long. In consequence, the excessive length of an utterance may lead to goal loss. It is not uncommon for such patients to change the subject of their utterance already at the very beginning, starting a monologue on a topic of their own choice. Schizophrenia sufferers experience problems with constructing a discourse on its semantic or phonetic level to a lesser degree. Based on the SESS scale one may observe that these patients show signs of impoverishment of syntax and linear connotation. What is more, such people can build their discourses on the basis of similarity of sound and they may use neologisms. In their utterances neologisms may appear. These elements occur due to the disorders of language pragmatics in people suffering from schizophrenia. It results in hampered communication with this group of patients.

The occurrence of some language phenomena is connected to the results of cognitive function tests in such patients. Although the correlation between these two aspects is not of statistical importance, in individual cases the occurrence of such phenomena, both on the lower (phonetic and semantic) levels of the language, such as: perseveration, clanging, verbal approximation, neologisms, and on the syntactic and pragmatic level (derailment, self-reference) in cognitive functions tests proves that a disorder of the schizophasia type considerably disturbs the ability to think and focus one's attention.

The lower language level disorders resulted in perseveration, clanging, neologisms and distinctive grammatical phenomena. The latter ones include inconsistency in terms of grammatical number while listing animal names and a tendency to use parts of speech other than nouns (in the case of verbs the forms were conjugated). Whereas the phenomena related to syntax and pragmatics caused lack of focus due to self-reference and derailment during concrete tasks on cognitive functions, which automatically lowered such patients' scores. Difficulties with attention focusing also resulted in discourse chaos – the lack of a clear strategy in the fluency test. For this reason, the fluency test among schizophrenia sufferers gave much worse results than among the members of the control group.

In its major part the presented study confirmed the theoretical aspects and previous studies on schizophasia. The qualitative analysis, however, demonstrated the specific features of the relationship between language disorders and cognitive functions which are often difficult to capture in statistical results. The most essential conclusion pertaining to the qualitative analysis amounts to the tendency among schizophrenia sufferers to list abstract words (for instance: love, mesalliance, motherhood), which has not been observed in the control group.

The conclusions described above prove two of my presented hypotheses. In the discourses of schizophrenia patients disorders of grammatical, syntactic and pragmatic nature occur. The scores of cognitive functions among these individuals are, in accordance with the assumed hypothesis, on a lower level than those in the control group. The hypothesis on the correlation between language disorders and the results of cognitive functions has not been entirely confirmed. The range of co-occurrence is not statistically significant. Nevertheless, the outcomes of the qualitative analysis of individual cases prove that the occurrence of some language disorders influences the result of the cognitive tests.

Investigating the question of schizophasia and its relation to the cognitive disorders in view of future studies, it is worth comparing the ability of schizophrenia sufferers to memorize not only nouns but also verbs, adjectives and adverbs.

The results indicating disorders on all levels of the language system encourage studies on how schizophrenia sufferers create a discourse. Perhaps during an analysis and while writing their own text self-monitoring would take place together with self-correction of possible mistakes which occur in the spoken language.

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