RESEARCH ARTICLE

ACTA Vol. 10, No. 1, 2012, 81-95
NEUROPSYCHOLOGICA

Received: 11.03.2011
Accepted: 16.02.2012

A – Study Design
B – Data Collection
C – Statistical Analysis
D – Data Interpretation
E – Manuscript Preparation
F – Literature Search
G – Funds Collection

NORM-BASED SUBJECTIVE EVALUATION OF COGNITIVE PROCESSES IN EPILEPTIC PATIENTS: A MICROGENETIC APPROACH

Krzysztof Owczarek[1(A,B,C,D,E,F)], Maria Bazan[2(A,B,D,E,G)], Natalia Mirska[2(A,D,F,G)]

[1] Department of Medical Psychology, Medical University of Warsaw, Warsaw, Poland

[2] Department of Neuropsychology, Andrzej Frycz Cracow University, Cracow, Poland

SUMMARY

Background: The aim of this study was to determine whether patients suffering from a chronic illness and taking medication which can affect their cognitive functioning are able to assess their own cognitive performance, as compared to healthy controls. Can we observe improvements in the accuracy of these self-evaluations as treatment progresses?

Material/ Methods: 58 epilepsy patients participated in the first part of the study. We used diagnostic tests to measure immediate verbal memory, concentration and psychomotor speed. The subjects were asked to predict their performance on these tests. In the second stage of the study, we conducted an analogous assessment in a group of 346 healthy second-year medical students.

Results: In the first stage of the study (before optimization of the patients' treatment) we obtained non-significant correlations between the subjects' predictions and actual objective results on the psychological tests. To optimize treatment, we decreased the number of anti-seizure drugs, corrected the drug concentration in the patients' blood and achieved an improved clinical status. This way we achieved a statistically confirmed improvement within all examined cognitive functions. However, we noted no improvement in the agreement between the patients' predictions and their empirical results. Among the healthy subjects the correlation between their predictions and actual results was likewise very low.

Conclusions: There was no agreement between the assumptions the patients made regarding their cognitive performance and the results they obtained in objective tests. The results are interpreted according to microgenetic theory, especially as regards symptom formation.

Key words: microgenetic theory, epilepsy, memory, symptom formation

INTRODUCTION

The methods used in the clinical assessment of information processing have been developed by neuropsychologists in order to establish developmental norms for cognitive functions, and also to enable us to better understand what the diagnostic methods used to measure these functions really evaluate (Pąchalska, 2008). The empirical approach, whose purpose is to evaluate the mechanisms of mental functioning (memory, attention, problem solving, selection, information processing, etc.) is based on comparing an individual's skills in terms of specific processes with the mean scores obtained in a given population. Other research schemata are also used. Based on repetitive measurements, their aim is to examine the obtained improvement or retardation level resulting from ongoing developmental processes, aging, or, in the case of chronically ill patients, side effects resulting from the prescribed medications.

Information processing involves numerous specific operations or functions. Thus, for example, a person who shows a high ability to memorize verbal material need not possess an equally high level of skill in terms of number processing. If we look at cognitive processes this way, content specificity is even a more basic aspect than the narrower processes identified through analyses of tasks or statistical factorial procedures. The qualitative analysis of cognitive processes, due to its subjectivity, requires the application of a number of methods designed to measure the skills essential to the complete evaluation of cognitive functions.

One of the crucial aspects contributing to the overall quality of cognitive performance is the person's concept of their own cognitive processes and performance in the acquisition and consolidation of new information. Such actions belong to a group of factors responsible for the control and processing of the acquired knowledge, i.e. activities, skills or meta-cognitive abilities. The accumulation of adequate information about the status of one's own cognitive resources is evidence for one's ability to organize their self-recognition strategies. The key to understanding this problem is to observe oneself throughout one's education (broadly understood) and grasp the context guiding this process, i.e. in which situations the stimuli are represented and which modalities they refer to. Another important aspect is the evaluation of one's state of mind at a given moment. This may seem to be extremely easy. Every day we are introduced to new stimuli and as a result we have the possibility or are even required to perform such analyses. The question is: how precise and unequivocal is the effect of such meta-cognitive analyses? With a chronically ill patient the situation becomes even more complicated (Owczarek, 1998; Owczarek, 2005; Owczarek et al., 2006; Rayner et al., 2010). Taking under consideration how complex cognitive processes are, we additionally need to bear in mind the patient's changing condition (medication intake, improvement/deterioration of health, lower self-esteem, illness-related depression, etc.).

In the case of epilepsy, which in its etiology as well as its clinical course is a very diverse illness (both acute and chronic), the quality of cognitive processes and related psychosocial functioning is of particular significance. Medical diagnosis of the severity of this illness normally involves a description of its cause, and the frequency and course of epileptic seizures. The physician's actions in optimizing the patient's pharmacological treatment are intended to bring the patient's seizures under complete control, or, when this is not possible, to limit their frequency and intensity. In the case of epilepsy, these extremely important clinical factors influence the patient's cognitive processes. In medical practice we sometimes observe that the treatment prescribed does not provide the expected positive outcomes. One reason for this can be the failure of the expected outcome, in terms of a reduction in the number or severity of epileptic seizures. It may turn out that the prescribed medications lead to a series of adverse side effects in the patient, which hinder their everyday functioning. Such drug-resistant treatment usually requires a change in treatment.

Confronted with the necessity to change their pharmacological treatment, many patients are reluctant to accept this fact and tend to worry about the outcome of their doctor's decision. Such concerns may arise already when the patient reads the information leaflet accompanying their anti-epileptic drug (AED). Pharmaceutical companies are obliged to attach a comprehensive list of adverse side effects, along with all symptoms which may appear at any stage of receiving the medication. This does not mean that these symptoms will appear in a patient who is complying with their physician's recommendation. It does, however, create a vision of a certain danger, and forces the patient to intensify their self-observation. Though patients should not be advised to reduce their vigilance, it should be noted that the appearance of such symptoms may be subjective in nature and result from the patient's exaggerated concerns about their health, or may even be the result of a suggestion found in the leaflet provided with the AED. Such a situation may obscure the picture of the objective and realistic results of changes taking place during the course of the treatment.

As early as 1983, English researchers Thomson and Trimble noted that patients in whom a reduction was noted in the number of seizures scored better in memory tests. They also demonstrated that a reduction in the number of AEDs taken was followed by a considerable improvement in the patients' cognitive functioning in terms of attention, visual-motor coordination, and, to some extent, memory. Other researchers have demonstrated relationships between medication doses and memory test results. There are also reports that point to the necessity of considering the concentration levels of AEDs in the patients' blood. It has been shown that in extreme cases patients with toxic levels of AEDs performed worse in recalling verbal material compared to those with lower therapeutic blood concentration levels of AEDs (Matthews & Harley, 1995).

In the case of epileptic patients, the question of discrepancies between neuropsychological memory test results and the patients' subjective feelings becomes crucial. Recent literature emphasizes the idea that the physician, despite positive results from the assessment of cognitive functions, should additionally be aware of their patient's point of view, as well as the patient's assessment of their well-being and cognitive functioning. Failing to take this point into consideration is often the cause of a loss of trust in the doctor, as well as a general impression on the part of the patient that they were not understood and their symptoms were not taken seriously (Owczarek, 2005). It would seem clear that consideration of the patient's subjective assessment is important and may be significant for the course of treatment.

Knowing the patient's point of view on their capabilities and efficiency in handling everyday problems related to their illness allows us to identify and understand their evaluation of the treatment progress. The aim of this study was to search for answers to the following questions:

How comparable are the results obtained from objective tests designed to measure cognitive functions in epileptic patients to the patients' subjective evaluation of their everyday functioning?

To what extent does the optimization of patients' pharmacological treatment objectively influence the state of their cognitive functions?

Does the improvement of patients' cognitive functions obtained through the optimization of their anti-epileptic treatment improve the accuracy of their own assessment of their cognitive status?

Do healthy subjects show higher accuracy than do epileptic patients in their evaluation of their own cognitive functions in comparison to the results obtained through examination of those functions?

MATERIAL AND METHODS

The study consisted of two stages. In both stages the same experimental and diagnostic methods were applied. Two populations were examined: epileptic patients with different seizure types and medical student. The ultimate aim of the study was to compare the results collected from both groups.

Stage I

In the first stage of the study we examined patients suffering from different types of epilepsy. We applied diagnostic tools to measure direct verbal memory span, learning processes, attention focus, psycho-motor speed and visual-motor coordination. The subjects were asked to predict their scores in these tests. The Rho correlation coefficient was used in order to measure the compatibility between the predictions and the test results.

Subjects and methods

We examined 58 patients suffering from epilepsy (32 women and 26 men) with an average age of 35 years, who were seen at the Anti-Epileptic Outpatient Clinic and the Neurology and Epileptology Clinic of the Center for Post-Graduate Medical Education in Warsaw (Owczarek et al., 2006). The group consisted of epileptic patients with seizures ranging from complex partial seizures and atypical absence seizures to tonic-clonic seizures. The patients' average age was

35 years (range: 17 to 45) and their average duration of illness was 15 years. The patients' intelligence quotient was within norms.

Before proceeding to the optimization of the pharmacological treatment, we found that in 22% of these patients the levels of all AEDs were incorrect, of whom 20% had their AED levels above the therapeutic level and 80% had AED levels below the therapeutic level. 54% of the patients took some medications whose levels corresponded to therapeutic levels. Only in 24% of patients who were receiving multiple medications were the therapeutic AED levels correct, with the number of medications taken ranging between 3 and 6. The criterion to optimize the patients' treatments was the lack of satisfactory control over epileptic seizures. The optimization of the pharmacological treatment involved a reduction in the number of AEDs taken, as well as obtaining an optimal concentration of AEDs inthe patients' blood (epileptic seizures control).

Psychological tests were conducted twice before the optimization of pharmacological treatment (polytreatment) and 3 to 5 months after its completion (monotreatment). These involved the measurement of the patients' direct verbal memory span, as well as their learning processes, attention focus, psycho-motor speed and visual-motor coordination. In order to assess cognitive functions we applied a selected neuropsychological test battery: digit repetition and digit symbols (Wechsler Intelligence Scale subtests), the Rey 15-Item Memory Test, and the Bourdon test. Before the examination, the subjects were familiarized with the testing protocol and instructions, as well as the course of the treatment. Afterwards, the subjects were asked what score they thought they would achieve in the tests. These predictions were collected with the help of a 7-Point Likert Scale, in which "1" corresponded to a very good score, whereas "7" to a very poor one. The average score was represented by "4". The level of compatibility between the psychological test scores and patients' predictions enabled us to define a level of adequacy in terms of patients' self-assessment of their cognitive processes. This procedure enabled us to examine the nature of objectively present and subjectively perceived differences, as well as changes occurring during the observation period. The repetition of the measurement after the optimization of the treatment allowed us - apart from defining the change perceived by the patients - to decide whether the optimization process made it easier or more difficult for the patients to correctly self-evaluate with regard to their cognitive processes.

Application of this procedure enabled us to determine the extent to which the epileptic patients were correct in their evaluation of the state of their memory as well as attention and psycho-motor speed. These were compared with the objective scores achieved in tests measuring those functions. The repetition of this measurement enabled us to assess the range of differences regarding the quality of cognitive processes and patients' self-assessment related to those processes after the optimization of the anti-epileptic treatment (differences between 1st and 2nd measurements).

RESULTS

The first stage of the examination required that the patients predict the quality of scores they would achieve in tests designed to measure cognitive functions. Having done that, the test was conducted.

In order to assess the compatibility of patients' self-assessment scores regarding the efficiency of their cognitive functions with the scores the patients obtained in objective tests we used the ρ (Rho) correlation coefficient.

The correlation coefficients between the predicted and actual scores we obtained (see Table 1) were low and statistically non-significant, ranging in all five trials from 0.09 to 0.24. However, the average correlation coefficient between the patient's own prediction and the number of repeated items in all five trials equalled 0.18. The eta coefficient, which describes the magnitude of common variances, reached the value of 0.032, which means that only 3% of the score variability in the Rey test explains the level of the ability to remember items initially assumed by the epileptic patients.

The low correlation coefficients and the lack of statistical significance in the digit memorizing test (see Table 2) proved that it was not possible to find statistically significant relations between the patients' opinions of their memory functioning and their actual test performance (the ability to memorize digits). The magnitude of the eta coefficient proves that there are no common variances (about 1‰) between the patients' own assessments of their ability to memorize digits and the objective measurement of this ability.

Similarly as with the results obtained through the previous scales, we did not find dependencies between the patients' own opinions regarding their expected performance in tests measuring their psycho-motor speed and the actual test results (see Table 3). The studied correlations turned out to be minor (0.16 and 0.21) and statistically non-significant, and the eta coefficient indicated that neither of these two variables exceeded the 5% common variance limit.

The optimization of the anti-epileptic treatment involved a reduction in the amount of drugs taken, as well as a change (adjustment) in medication doses.

Table 1. Comparability of patients' self-assessment regarding direct verbal memory to results from the Rey 15-Item Test before optimization of anti-epileptic treatment

Trial	ρ (Rho) Coefficient	Eta Coefficient	Statistical significance
I	0.09	0.008	n. s.
II	0.13	0.017	n. s.
III	0.18	0.032	n. s.
IV	0.24	0.058	n. s.
V	0.16	0.026	n. s.
R	0.18	0.032	n. s.

n.s. – score statistically non-significant
R – all five trials

Table 2. Comparability of patients' self-assessment regarding direct memory for digits compared with results from the Wechsler Test for digit repetition (Wechsler Scale) before optimization of anti-epileptic treatment

Measurement	ρ (Rho) Coefficient	Eta Coefficient	Statistical significance
forward	0.08	0.006	n. s.
backward	0.12	0.014	n. s.
together	0.10	0.001	n. s.

n.s. – score statistically non-significant

Table 3. Comparability of patients' self-assessment regarding their psycho-motor speed compared with objective scores obtained in the Bourdon Test and the Wechsler Digit Symbols Search Scale before optimization of anti-epileptic treatment

Measurement	ρ (Rho) Coefficient	Eta Coefficient	Statistical significance
Bourdon Test	0.16	0.026	n. s.
Digit Symbols	0.21	0.042	n. s.

n.s. – score statistically non-significant

Table 4. Effect of optimization of anti-epileptic treatment on results from the Rey 15-Item Memory Test

Trial	before optimization	after optimization	Statistical significance
I	6.1	6.6	0.05
II	7.9	8.8	0.005
III	9.0	10.1	0.005
IV	9.9	11.5	0.001
V	11.1	12.4	0.005
R	44.1	49.4	0.005

R – all five trials

During the optimization we managed to decrease the amount of AEDs from the average number of 3.11 to 1.34; the number of epileptic seizures also decreased from the average monthly number of 18.2 to 6.3. After treatment optimization and stabilization of its pharmacodynamic and clinical effects, the examinations were repeated. For statistical comparison of the results obtained before and after the treatment optimization we applied One-Way Analysis of Variance (ANOVA), with the level of significance set at $p \leq 0.005$.

The comparison of the scores obtained by the epileptic patients in the Rey 15-Item Memory Test before and after their treatment optimization (see Table 4) demonstrated statistically significant dependencies (from 0.05 to 0.001). In all trials there was a marked score improvement after the optimization, which increased the average score after the optimization (49.4) compared to that obtained before the optimization (44.9). The difference turned out to be statistically significant on the level of $p<0.005$.

In the digit repetition test (see Table 5) we also noted a significant improvement. In both forward and backward digit repetition, the differences between the mean values obtained after and before the treatment optimization turned out to be statistically significant on the level of $p<0.001$.

Similarly as with the memory tests, the optimization of the anti-epileptic treatment contributed to improved results regarding patients' psycho-motor speed (see Table 6). The comparison of the results collected before and after the optimization caused difference in mean values on the level of $p<0.001$.

The results of comparability of predicted cognitive functions and the results actually obtained regarding those functions should provide an answer to the question whether the improvement in the state of the processes achieved by the optimization of the treatment also improved the dependencies between the patients' predictions and their achieved results.

The results of comparison between the patients' opinions about their expected results regarding memorisation of verbal material and those actually achieved in the Rey 15-Item Test (see Table 7) showed minor and statistically non-significant correlations in all examined trials. Altogether, the mean correlation coefficient between the patients' own predictions and the number of repeated items in all five trials equalled 0.20. The eta coefficient value (0.040) confirms only 4% co-variance of the observed variables. Such a score indicates a virtual lack of

Table 5. Effect of optimization of anti-epileptic treatment on digit repetition test scores

Measurement	before optimization	after optimization	Statistical significance
forward	4.9	5.4	0.001
backward	3.4	4.1	0.001

Table 6. Effect of the optimization of the anti-epileptic treatment on psycho-motor speed test results

Measurement	before optimization	after optimization	Statistical significance
Bourdon Test	389.2	328.7	0.001
Digit Symbols	33.6	41.8	0.001

Table 7. Comparability of patients' self-assessment regarding direct verbal memory compared with Rey 15-Item Test after optimization of anti-epileptic treatment

Trial	ρ (Rho) Coefficient	Eta Coefficient	Statistical significance
I	0.19	0.036	n.s.
II	0.21	0.044	n.s.
III	0.18	0.032	n.s.
IV	0.24	0.058	n.s.
V	0.12	0.014	n.s.
R	0.20	0.040	n.s.

n.s. – score statistically non-significant
R – all five trials

dependency between the level of abilities assumed by the epileptic patient regarding their ability to memorize a series of word items and the results obtained in the Rey 15-Item Memory Test. We observed this lack of dependency in the epileptic patients after the optimization of the anti-epileptic treatment, despite the fact they scored better in the memory test compared to their scores from before the optimization process.

The low correlation coefficients and lack of statistical significance in the digit memorising test (see Table 8) proved that it was not possible to find statistically significant relations between the patients' opinions of their memory functions and the test scores. The eta coefficient value (only 2% of common variances), along with the lack of statistical significance, indicates virtually no dependency between the scores obtained in the digit memorizing test and the patient's own assessment of this skill. This result was observed after the improvement of the patients' memory, measured with the Digit Repetition Test and is the effect of the optimization of the anti-epileptic treatment.

Similarly to the time before the optimization of the treatment, due to the optimization we did not manage to find dependencies between the patients' own opinions regarding their expected scores in tests measuring their psycho-motor speed and the test results (see Table 9). The observed correlations turned out to be minor (0.19 and 0.22) and statistically non-significant, and the eta coefficient indicated that neither of the two variables exceeded the 5% co-variance limit.

Throughout the study we did not obtain statistically significant correlations between the patients' self-assessment of their cognitive processes and the results obtained in specialized tests measuring those functions. This applied to the first examination, before the optimization of the anti-epileptic treatment, and we ob-

Table 8. Comparability of patients' self-assessment regarding memorization of digits and the results from the Wechsler Test for digit repetition (Wechsler Scale) after optimization of anti-epileptic treatment

Measurement	ρ (Rho) Coefficient	Eta Coefficient	Statistical significance
forward	0.11	0.012	n. s.
backward	0.16	0.026	n. s.
together	0.13	0.017	n. s.

n.s. – score statistically non-significant

Table 9. Comparability of patients' self-assessment regarding psycho-motor speed and objective scores obtained through the Bourdon Test and Wechsler Digit Symbols Search Scale after optimization of anti-epileptic treatment

Measurement	ρ (Rho) Coefficient	Eta Coefficient	Statistical significance
Bourdon Test	0.19	0.036	n. s.
Digit Symbols	0.22	0.048	n. s.

n.s. – score statistically non-significant tained analogous results during the second examination as well, after the optimization, in which we aimed at an improvement of the patients' cognitive functions.

With the results of the first part of the study collected, we decided to search for the relationship between healthy subjects' opinions of their cognitive processes and objective results observed through examination of those functions.

Stage II

Study subjects and methods

In the second stage we examined 246 second-year medical students (190 women and 56 men) in the Faculty of Health Science. All subjects were 20 to 28 years of age, with a mean age of 21.4 years. At this stage of the study, similarly to the previous one, we applied tests designed to measure memory functions and psycho-motor speed. They focused on the measurement of direct verbal memory span, learning processes, attention focus, psycho-motor speed and visual-motor coordination. To assess cognitive functions we applied a selected neuropsychological test battery: digit repetition and digit symbols (Wechsler Intelligence Scale subtests), the Rey 15-Item Memory Test, and the Bourdon test. Similarly to the procedure with the epileptic patients, directly before the beginning of the procedure involving neuropsychological tests all the subjects were familiarized with the testing protocol. After the subjects had confirmed their comprehension of their task, they were asked to assess their scores. The subjects were asked to mark their predicted score on a 7-point Likert Scale, where "1" corresponded to a very good score, and "7" corresponded to a very poor one. An average score was represented by "4". The level of comparability between the psychological test scores and the subjects' predictions of their score enabled us to define a level of adequacy in terms of the subjects' self-assessment of their cognitive processes.

RESULTS

The comparison of the predicted quality of the subjects' cognitive processes to the scores obtained by them in tests measuring these functions was assessed on the basis of the ρ (Rho) correlation coefficient.

The correlation coefficients we obtained (see Table 10) indicate slight comparability of the predicted verbal memory quality and the scores obtained in subsequent repetitions of Rey 15-Item Test. The value of the correlation coefficients ranged from 0.081 to 0.224. The eta coefficient (correlation measure) indicated that the level of common variance for both variables ranged between less than 1‰ up to 5%. The results of Rey Complex Figure Test were similar. Our initial estimation, before the study was conducted, revealed only 5% of common variances with the overall test scores.

We can, therefore, conclude that in the case of the healthy subjects we do not observe a correlation between the subjects' expected performance in the item repetition test and the actual scores they obtained in this test.

Table 10. Comparability of the healthy subjects' self-assessment regarding direct verbal memory and the results from the Rey 15-Item Test

Trial	ρ (Rho) Coefficient	Eta Coefficient	statistical significance
I	0.224	0.050	0.001
II	0.221	0.049	0.001
III	0.213	0.045	0.001
IV	0.143	0.020	0.01
V	0.081	0.007	n. s.
R	0.230	0.053	0.001

n.s. – score statistically non-significant
R – all five trials

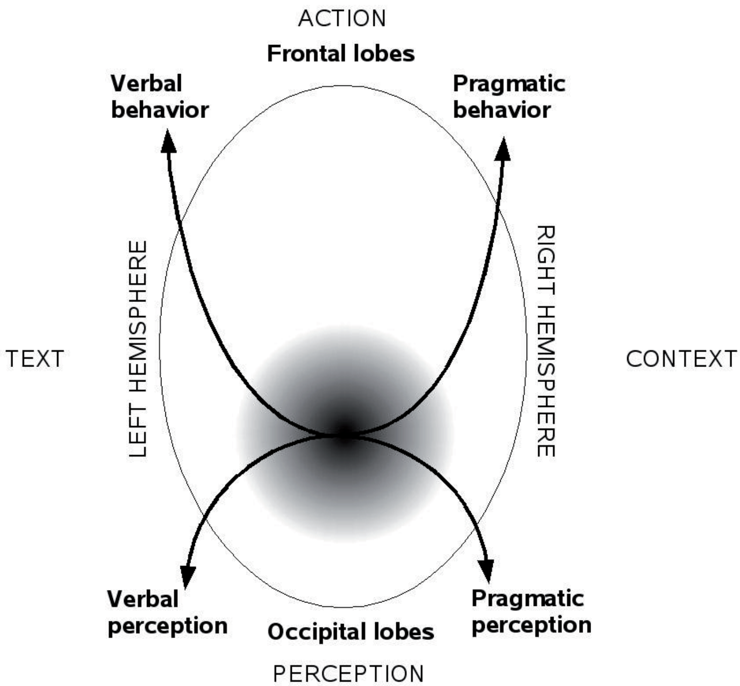

Fig. 1. Microgenetic model of the perception-action cycle on the basis of linguistic text and pragmatic context [Pachalska 2008]

Among the healthy subjects the low correlation coefficients and the lack of statistical significance in the digit memorizing test (see Table 11) proved that it was not possible to find correlations between the subjects' opinions regarding their memory functioning and the actual test scores. The eta coefficient value (from less than 0.5‰ to less than 2% of common variances) proves the virtual lack of correlations between the scores on the digit memorizing test and the subjects' initial assessment of this skill before this test was conducted.

Table 11. Comparability of healthy subjects' self-assessment regarding direct memory of digits and the results from the Wechsler Test for digit repetition (Wechsler Scale)

Measurement	ρ (Rho) Coefficient	Eta Coefficient	Statistical significance
forward	0.067	0.004	n. s.
backward	0.130	0.017	n. s.
together	0.094	0.009	n. s.

n.s. – score statistically non-significant

Table 12. Comparability of healthy subjects' self-assessment regarding their psycho-motor speed and the objective scores obtained in the Bourdon Test and the Wechsler Digit Symbols Search Scale

Measurement	ρ (Rho) Coefficient	Eta Coefficient	Statistical Significance
Bourdon Test	0.277	0.077	0.001
Digit Symbols	0.244	0.060	0.001

n.s. – score statistically non-significant

Among the healthy subjects, as in the group of epileptic patients, we did not find any correlations between the healthy subjects‘ subjective opinions regarding their abilities in tests measuring their psycho-motor speed and the objective scores obtained through these tests. The correlations turned out to be minor (0.244 and 0.277) and the eta coefficient indicated that neither of the two variables exceeded the 8% co-variance limit.

DISCUSSION

Metacognition involves complex and multi-aspect actions involving the monitoring and controlling of cognitive processes based on one's own experiences. The aim of these endeavors is to obtain knowledge about one's functional abilities within the domain of cognitive skills. The study we conducted enabled us to broaden our knowledge concerning the metacognitive skills present in epileptic patients at various stages of their anti-epileptic treatment. They also helped us learn about those metacognitive skills present in healthy subjects. Moreover, the results obtained from the epileptic patients demonstrated the positive influence of their treatment optimization within all controlled parameters of cognitive functioning in neuropsychological tests.

The first measurement conducted with the epileptic patients' participation did not yield correlations between the predicted results regarding their own cognitive functions and the objective results obtained in tests designed to examine these functions. After the optimization of the anti-epileptic treatment we calculated the mean difference values of the scores observed in first and second trials (after treatment optimization). It turned out that within the scope of all the scales used for the objective measurement of the subjects' cognitive processes the differences were statistically significant ($p<$ from 0.05 to 0.001). During the tests, due to the optimization of the treatment, the patients showed improvement related to their direct verbal memory and learning, both digit and word items. Also, their psychomotor speed and visual-motor coordination improved.

We might expect that a marked improvement regarding cognitive functions after optimization of anti-epileptic treatment would similarly influence the patients' opinion of their progress in terms of these same cognitive functions. The questions which the patients answered involved assessment of their predicted score regarding the parameters measured through a selection of neuropsychological tests. However, in the second examination the magnitude of the expected results was not commensurate with the actual results, comparing the patients' own evaluation of their cognitive functions with the scores obtained through tests designed to examine those functions. These results confirm the discrepancies between the patients' opinions of their memory functioning and psycho-motor speed and the objective results obtained through tests designed to measure these cognitive parameters. It should be emphasized that the patients achieved these results during the second examination, after the optimization of the anti-epileptic treatment, the result of which was a major improvement in the patients' cognitive functions. According to epileptologists, such results are connected to depression and feelings of lower self-esteem and lower self-assessment in epileptic patients (Owczarek, 2005; Rayner et al. 2010).

The collected results prompted us to study these same correlations in a healthy population. We could assume that among healthy subjects we will observe a greater metacognitive ability reflected in greater compatibility between one's self-description and results collected through psychological tests.

Meanwhile, the results obtained from the healthy subjects also show no clear relationship between the level of one's declared ability and the results achieved in the neuropsychological tests measuring these functions. The obtained correlation coefficients turned out to be low, and the interpretation of this result can cause many difficulties. The eta coefficients marking the co-variance limit of the two examined variables ranged from less than 1‰ up to 5%. Such a result confirms the existence of significant discrepancies between opinions of the healthy subjects regarding their cognitive functioning and the scores of objective tests.

It seems likely that this results from inadequacies regarding the use of objective criteria applied by people when evaluating their cognitive skills or the cognitive skills of other people. Whenever an evaluation is made, it must consider certain concrete values which constitute the subject of the comparison. While applying the objective criteria used in empirical studies, normally a measure of a central tendency in a population is used. When we make comparisons, we do it on the basis of the so-called "hot knowledge," i.e. an immediate impression based on sensory data. For example, the comparison of one's own height with that of others does not cause difficulty. We see to what extent other people are endowed by nature in terms of their height, and we mostly know whether we are taller or shorter than a given person. We also have an idea of the average height in a population, which enables us to find the answer to the question of whether we are taller or shorter than the average person in that population. Meanwhile, knowledge of the speed and range of assimilated knowledge in other people is not visible and not known to us. We can, however illusory it is, rely on declarations delivered by people who know that they have good or bad memory. The question, however, is: compared to whom? Usually, when comparing the state of our own cognitive functions we do not have a precise idea of what potential we possess in this regard; not to mention the fact that we do not know the value of a mean tendency in the population regarding cognitive functions. In these cases making any correct comparison does not seem feasible.

The obtained test results can be interpreted using the microgenetic theory of symptom formation, which emphasizes the fact that self-esteem is a subjective process in which the patient's feelings play a crucial role, and which should be seen as a function of the whole brain. It also states that processes of perception and action, which use a specific language in the process of one's mental state formation, enable self-recognition (Brown & Pachalska, 2003).

It is important to note that according to microgenetic theory, the subject (that is, the person with epilepsy) is the whole of subjectivity, which includes the mind, body, space and external objects.

The direction of actualization – or becoming – is from the instinctual core of the subject into the body and objects in space. The trajectory from core to object – which comprises one epoch of subjectivity – actualizes the being of the state. The completion of one cycle of becoming-into-being gives existence to the state. The object appears as the outer portion of the state, but its existence requires the entire transition (Pąchalska & MacQueen, 2005). An object is the exteriorized portion of the subject. It is a subjective event. It differs from a physical or noumenal entity outside the subjective field, which similarly exists over the duration – temporal extensibility – of its own actualization, in which an important role is played by the dysfunctions of frontal lobe. In epilepsy, there is a functional disorganization of cognitive processes, which may also have influence for the subjective perception of cognitive disturbances (Brown & Pachalska 2003, Pachalska 2011, 2012).

At the end of this discussion we would like to emphasize that the research presented here is a preliminary analysis. In order to continue this study it would be necessary to increase the size of the groups.

CONCLUSIONS

On the basis of the conducted studies we can draw the following conclusions:

1. In this study, the epileptic patients obtained a generally low correlation between their evaluation of their own abilities and the actual test results. This means that the patients' opinion concerning the state of their cognitive process deviates from objective measures (psychological tests).
2. The optimization of the anti-epileptic treatment, despite having improved the scores in cognitive tests, did not improve the correlations between the subjects' own evaluation of their cognitive processes and the objective results collected through cognitive tests.

3. Monitoring the state of cognitive functions with psychological tests should be complemented by the patient's subjective feelings. This constitutes the basis of verifying the doctor's or therapist's opinion regarding their patient's well-being and promotes better communication.
4. The results of correlation analysis in the group of healthy subjects also indicated a lack of clear dependencies between the level of declared cognitive abilities and the results achieved in cognitive tests. This shows a lack of comparability between the opinions given by the healthy subjects about their cognitive functioning and their abilities.
5. The microgenetic theory of symptom formation, which emphasizes the fact that self-esteem results from a subjective process, in which patient's feelings play a crucial role, and which should be seen as a function of the whole brain. It also states that processes of perception and action, which use a specific language in the process of one's mental state formation, enable self-recognition and can help interpret the obtained results.

REFERENCES

Brown, J.W. & Pąchalska, M. (2003). The symptom and its significance in neuropsychology. *Acta Neuropsychologica, 1(1)*, 1-11.

Matthews, C. & Harley, J. (1995). Differential psychological test performances in toxic and non toxic adult epileptics. *Neurology, 25*, 184-188.

Owczarek, K. (1998). Psychospołeczne aspekty padaczki. *Epileptologia, 6(2)*, 123 -138.

Owczarek, K. (2005). Jakość życia w padaczce. Epileptologia, 13 (suppl. 1), 52.

Owczarek, K., Jędrzejczak, J., Rozenek, H. (2006). Cognitive functioning in neuropsychological tests and self-ratings in patients with epilepsy. *Acta Neuropsychologica, 4*, 33-47.

Pachalska, M. (2008). *Rehabilitacja neuropsychologiczna: Procesy poznawcze i emocjonalne*. Lublin: Wydawnictwo Naukowe UMCS.

Pachalska, M. & MacQueen, B.D. (2005). Microgenetic theory. A new paradigm for contemporary neuropsychology and neurolinguistics. *Acta Neuropsychologica, 3(3),* 89-106.

Pachalska, M., Wachowicz, N. & Bidzan, M. (2010). Disintegration of higher language functions in patients with right hemisphere damage. *Acta Neuropsychologica, 8(2)*, 68-98.

Pachalska, M., MacQueen, B.D., Kaczmarek, B., Wilk-Franczuk, M. & Herman-Sucharska, I. (2011). A case of "Borrowed Identity Syndrome" after severe traumatic brain injury. Medical Science Monitor, 17(2), CS18-28.

Rayner, G., Wrench, J.M. & Wilson S.J. (2010). Differential contributions of objective memory and mood subjective memory complaints in refractory focal epilepsy. *Epilepsy & Behavior, 19*, 359-364.

Thompson, J. & Trimble, M.R. (1983). Anticonvulsant serum levels; relationship to impairments of cognitive functioning. *Journal of Neurosurgery & Psychiatry, 46*, 227-233.

Address for correspondence:
Prof. Krzysztof Owczarek, Ph.D.
Warszawaski Uniwersytet Medyczny
Zakład Psychologii Medycznej
ul. Żwirki i Wigury 81A
02-091 Warszawa, POLAND
e-mail: krzysztof.owczarek@wum.edu.pl