CASE STUDY

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THE CLINICAL IMAGE OF MEMORY, ATTENTION, AND EXECUTIVE FUNCTIONS IN A SCHOOL-AGED CHILD WITH AUTOIMMUNE EPILEPSY: A CASE STUDY

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SUMMARY

Background The aim of this study was to identify specific aspects of the cognitive and socioemotional functioning of a school-age child with autoimmune-resistant epilepsy, and to provide a detailed explanation of the executive dysfunctions significant in this type of disorder.

Case study: A battery of neuropsychological tests and clinical trials were used to neuropsychologically diagnose an eight-year-old girl. Data from an interview with the patient's mother, observational data, and the results of previous psychological and medical tests were also taken account. Neuropsychological diagnosis was performed in line with the clinical–experimental and psychometric -test models.

Results: The patient's current level of intellectual functions is below average. The patient obtained low results in tests examining executive functions, direct auditory memory, phonemic hearing, and visual–spatial organization. In comparison with children of her age group and with similar intelligence quotients, she obtained average results relating to tasks involving direct visual memory. No difficulty was seen in terms of semantic fluency, concentration, or persistence of the attention process.

Conclusions: Executive dysfunctions are among the dominant disorders seen in clinical settings; these significantly hinder the systematic and orderly organization of the child's learning process. Such difficulties in cognitive functioning, but also in emotional and social functioning, can significantly impede the normal development of the child.

Key words: executive dysfunctions, cognitive disorders, child epilepsy, neuropsychological diagnosis

INTRODUCTION

Epilepsy is a disorder of the brain that manifests as epileptic seizures (clinical projections of discharges of cortical neuron groups) leading to neurobiological, psychological, and social consequences (Fisher, van Emde Boas, Blume et al. 2005). According to current criteria (Fisher, Acevedo, Arzimanoglou et al. 2014), epilepsy is diagnosed when: (1) at least two reflex seizures occur over 24 h apart; (2) one unprovoked (or reflex) seizure occurs, with a probability of further seizures similar to the general recurrence risk after two unprovoked seizures, over the next 10 years; (3) there are current symptoms of epilepsy syndrome. Childhood epilepsy occurs in about 0.5%–1% of children and is thus one of the most common neurological diseases in the child and adolescent population. Due to various symptoms constituting different clinical images of epilepsy, and their underlying configurations of biological and psychological factors, several types of epilepsy and epilepsy syndromes have been distinguished (Dreifuss 1987). The ICD-10 (Pużyński & Wciórka 1999) lists benign epilepsy of the child with middle–spinal focal potentials in the EEG and epilepsy with occipital discharge in the EEG.

Drug resistant epilepsy is seen in about 10% of patients; it may result from malformations of the cerebral cortex, the frequent occurrence of generalized seizures, atypical attacks of unconsciousness before treatment, or the early onset of the disease (at about one year of age) (Kozera-Kępniak, Jastrzębski & Klimek 2013; Kurkowska-Jastrzębska, Pilip, Niedzielska et al. 2005). In autoimmune drug-resistant epilepsy, there are disorders in the immunoglobulin levels in the body fluids. In 10%–20% of children diagnosed with drug-resistant epilepsy, there is a decreased level of IgA-class immunoglobulins in the serum (Fiszer 2001); in the others, NSAbs antibodies are often found in serum or cerebrospinal fluid, and a positive response to immunotherapy is seen (Suleiman, Brilot, Lang et al. 2013; Suleiman & Dale 2014). Pathological autoimmune changes may coexist with epilepsy in the form of immunological diseases, or may manifest themselves in specific epileptic syndromes (e.g., Rasmussen's encephalitis, West syndrome), but are most often noticed as nonspecific changes in children with unpaired epilepsy (Palace & Lang 2000).

Due to coincidences in the etiopathogenesis of biological factors (structural changes in the CNS, genetic background, disorders of the autoimmune system) and psychological factors (relations with loved ones, social support, cognitive resources, temperament) and the occurrence of side effects of antiepileptic medicines (Halczuk 2005; Talarska & Steinborn 2009; Ulate-Campos & Fernández 2017), these patients are at a high risk of developing mental disorders (Grabowska-Grzyb 2005). In the course of various epileptic syndromes with different pathogeneses, pathomechanisms, and severities of epileptic seizures (generalized, partial, unilateral, or unclassified), there may be emotional difficulties (secondary, primary), global cognitive changes (reduced general intellectual functioning), and selective changes (e.g., dyslexia and dyscalculia) (Mojs 2010).

The clinical literature indicates that executive dysfunctions are among the most common symptoms of child epilepsy. Executive functions are defined as

mental abilities that allow the formulation of the goals necessary for effective action (Koechlin 2016; Lezak, Howieson & Loring 1995). In the literature, many executive functions are distinguished; most often, following Muriel D. Lezak (1995), four basic elements are described: volition, planning, purposive action, and effective performance.

There are many concepts of executive functions (Jodzio 2008), but at present the microgenetic approach provides the most precise explanation of their essence (Brown & Pąchalska 2003). Pąchalska, Kaczmarek & Kropotov (2014) indicate that the executive system is involved in processing new situations and is responsible for inhibiting automated reactions (reduction of perseveration). In microgenetic theory, damage to the central nervous system delays the correct development of mental functions and leads to premature termination in the form of symptom separations – that is, executive dysfunction (Pąchalska 2008). In this way, the presence of perseveration errors in patients is explained, as the perceptual and memory impressions of the past are repeated in the present (Pąchalska, Kaczmarek & Kropotov 2014). The microgenetic theory of symptoms (Pąchalska, Góral-Półrola, Mueller & Kropotov 2017) also explains the development of other cognitive processes, including the microgenesis of perception that underlies the formation of executive functions.

Depending on the type of CNS dysfunction, various intensifications of cognitive and executive disorders have been observed (Elger, Helmstaedter & Kurthen 2004). In temporal lobe epilepsy, the dominant effects include episodic memory disorders, hallucinations, psychoses, and emotional disorders (anxiety, hysterics); in epilepsy of the parietal and occipital lobes, the visual–spatial functions are weakened; in frontal lobe epilepsy, disorders of some executive functions elements (O'Muircheartaigh & Richardson 2012; Widjaja, Zamyadi, Raybaud et al. 2013) and of verbal operating memory are seen (Lopes, Simões, Monteiro et al. 2013). Neuroimaging data (Lin, Siddarth, Riley et al. 2013) also point to a relationship between attention deficits and debilitated intellectual functions and a reduced volume of the hypothalamus in the left hemisphere.

The clinical image of temporal lobe epilepsy in children consists of disorders of the short-term memory (Grabowska-Grzyb 2005; Helmstaedter, Kurthen, Lux et al. 2003; Melbourne Chambers, Morrison-Levy, Chang et al. 2014), the operational memory (van Iterson & de Jong 2017), cognitive control (Zhang, Yang, Qin et al. 2017), and better monitoring of learning processes than in patients with frontal lobes epilepsy (Feuntes & Smith 2015). Weakening of executive processes is observed in children with Rolandic epilepsy (Canario, Veiga & Abreu 2017a, 2017b), which is characterized by a mild course and spikes in central and temporal areas (Neumann, Helmke, Thiels et al. 2016).

The aim of the study was to identify specific aspects of cognitive and socioemotional functioning in a school-age child with autoimmune-resistant epilepsy and to provide a detailed explanation of the executive dysfunctions significant in this type of disorder. The neuropsychological examination was performed on the basis of psychometric test and clinical–experimental models.

CASE DESCRIPTION ON THE BASIS OF A NEUROPSYCHOLOGICAL EXAMINATION

Data from an interview with the child's guardian. The patient is an eight-year-old girl in third class in elementary school, born via Caesarean section (on time and without complications). Her Apgar score was initially 8 (lowered due to breathing difficulties), and later 10; the birth weight was 3.20 kg; there were no other health problems in the infancy period, and she was given no medication.

At the age of two, she experienced the first polymorphic epileptic seizures (no generalized seizures, loss of consciousness for a few seconds), which occurred every day, usually at night. Initial diagnosis indicated drug-resistant epilepsy of probable immune origin. During a weeklong stay at the Department of Neurology in 2011, a diagnosis was made of epilepsy of unknown etiology with polymorphic seizures (myoclonic, atypical, unconscious, tonic and tonic–clonic, psychomotor). During this time, the child was diagnosed with hypersensitivity to gluten, and a gluten-free diet was introduced on the recommendation of a neurologist. In 2014, a diagnosis of epilepsy with autoimmune background was made during a remission period. For about 5.5 years, there have been no epileptic seizures; there is a current suspected diagnosis of autoimmune infection.

Based on the results of EEG studies in 2011 (during drowsiness and spontaneous sleep; recording time 25 minutes; sleep stage NREM I–II), multifocal changes were seen with an outstanding prevalence on the right side and generalized paroxysms; in 2016 (while awake, drowsy, and in spontaneous sleep; recording time 40 min; sleep stage NREM I–II–III), the changes were localized in the anterior temporal and frontal central regions on the right side.

Psychomotor development did not proceed harmoniously. Motor skills: delayed head lifting, sitting down, standing; walking (approximately 2 years old); going up the stairs (approximately 2.5 years old); cycling (5 years old). Visual and motor coordination: pinching grip (approximately 10 months old); grabbing objects, transferring items from hand to hand, building: normal (despite noticeable sensory disturbances and sensory integration). Speech: babbling, first words (approximately 8–12 months), holophrases (approximately 2 years); understanding skills were maintained until year 4. After the fourth year of life, a gradual deterioration of cognitive abilities was observed in multithreaded statements (labyrinths of the thought process), executive dysfunctions (planning, organizing activities), attention deficit disorders, verbal–auditory disturbances, and recalling action algorithms. A school-readiness survey drew particular attention to the maintenance of visual memory as well as disturbances in phonic analysis and sentences. From the interview, it appears that up to 8 years of age there were significant difficulties in holding verbal information in memory, in auditory perception, and in executive functions, as well as dyslexia and dyscalculia.

Social and emotional development. The interview indicates that social and emotional development proceeded normally during infancy and early childhood. In the preschool period, a strong attachment to the mother was observed (sus-

picion of separation anxiety), with the child sleeping with her father and mother until the age of 7. The need to remain in the peer group was maintained, as were correct understanding of gestures and social situations, compliance with social norms and principles, and the occurrence of "serious" and "innocent" play in a timely manner. In addition, an interest in artistic activities and an aversion to organized team games, such as football, were observed. At preschool and school age, she preferred games and tended to spending free time in the family environment. The girl received, and continues to receive, significant support from important people (parents, grandparents, and educators), and communicates well with her younger brother. Until approximately 4 or 5 years of age, there were no emotional difficulties; from year 4 to 7, there was emotional lability (tantrums combined with anger escalation), difficulties in postponing gratification and in emotional control, excessive emotional sensitivity, caring, and a noticeable strong sense of shame and inferiority. From the age of 7, emotional and social functioning were adequate to the situation.

Therapy and Treatment. Based on data from the interview and the medical and psychological documentation: The girl initially took Sabril, Topamax, with no improvement. After increasing the dose (2 × 15mg), the symptoms intensified. From the age of 4, she was taking Orifiril Long 2 × 300 mg until March 2017, when the decision was taken to discontinue the medicine. She stopped taking Orfilir Long in September 2017 (along with Topamax, Frisium, Solu-medrol intravenous, combined with immunoglobulins, Kalium, and Prazol). Topamax was also soon discontinued due to intolerance. The patient was prescribed Sabril, which was also quickly discontinued due to the appearance of attacks of hysterics and weight loss. Adverse reactions were also found in connection with the use of other drugs between the ages of 4 and 6. In the opinion of her parents, the girl responded poorly to pharmacological therapy; a subtle improvement occurred only after administering Kepra (2 × 250 mg). She is currently taking Kepra at a dose of 2 × 125 mg.

Given the negative effects of pharmacological therapy and her nonharmonious psychomotor development and accompanying emotional and social difficulties, psychological help was required. On the basis of psychological and pedagogical opinions, the girl was provided psychological and pedagogical help in preschool, and then at school. From the preschool period, she underwent various forms of therapy: pedagogical (with the main goal of improving the graphomotor skills), biofeedback (for two years), use of "Brain Boy", sensory integration, kynotherapy, equine-assisted therapy, Montessori therapy, and pharmacotherapy. Individual neuropsychological therapy has been underway for the last year.

PROBLEMS REPORTED BY THE CHILD'S PARENTS

The girl presented at the Psychological and Pedagogical Clinic in order to assess her general functioning and receive recommendations for further therapeutic work. The mother described the child's cognitive impairment and the accompanying

emotional and social difficulties, probably resulting from the course of epilepsy with undetermined etiology (suspected drug-resistant epilepsy with autoimmune background). The mother stressed that the scale of cognitive disorders prevented her daughter from absorbing school knowledge in an efficient, systematic, and effective manner. Another problem was the dubious effectiveness of the forms of therapy she had received (including pharmacotherapy).

RESEARCH QUESTIONS

Taking into account the problems reported by the mother, three main research questions were drawn up:

1. Are the intellectual functions developing harmoniously?
2. What is the clinical image of the cognitive and executive disorders resulting from CNS dysfunctions in the course of autoimmune drug-resistant epilepsy?
3. Are there any emotional and social difficulties in the child?

In order to answer the three main research questions, a study was carried out using the psychometric -test and experimental-clinical models.

NEUROPSYCHOLOGICAL RESEARCH USING PSYCHOLOGICAL TESTS AND CLINICAL TRIALS

The study used the methods of neuropsychological diagnosis to assess the efficiency of cognitive and emotional–social processes. Due to a lack of validated methods in the representative sample of the population of Polish children, the author referred to Łuri's tradition, which justifies deduction on the basis of results by experimental methods and tests in experimental versions (Borkowska & Scholz 2010). This article does not contain the results of all the clinical trials that were used.

Measurement of the efficiency of intellectual functions

The Culture Fair Intelligence Test– 1 version (CFT 1-R) by Raymond B. Cattell.

The confidence intervals for the recalculated results, with a probability of 85%, are <5; 9> for part I (based on perceptual and perceptiveness abilities) and <3; 5> for part II (which examines the processes of abstraction in thinking: inference, capture, recognition, and understanding of rules and connections to figural material). The general result indicates the level of fluid intelligence, with results ranging from a light degree of intellectual disability to lower-than-average intellectual capabilities (IQ = 74, <65; 82>). There was a noticeable significant difference between the results of parts I and II, allowing for the specification of intellectual resources and deficits in the patient.

WS/ZF-R. Rudolf Weiss Test of Words and Test of Numbers (Part A).

For the Test of Words, the recalculated results on the sten scale, with a probability of 85%, are 5 <3; 6> for the Number Test and 7 <5; 8>, pointing to higher capabilities of processing nonsymbolic verbal information.

Direct and indirect measurement of executive function efficiency

WCST. Wisconsin Card Sorting Test. The results indicate a decrease in executive functions (low indicators in the three most reliable subtests: total errors: 75, percentage of conceptual answers: 24%, number of categories: 2). The total number of errors includes perseveration responses (RR = 56), perseverational errors (RR = 44), and nonperseverational errors (RR = 31). The learning process is disturbed (RR = -72.83). At her very best, the patient managed to maintain attention on the task, as seen by the very high number of tests carried out before the first category was passed (within in the first ten trials) and her failure in maintaining attention (RR = 1).

Trail Making Test. Poor quality in both samples: A (t = 110 s, 1 error), B (t = 180 s, 15 errors). In the second example (B), there were considerable difficulties in understanding the instructions, as a result of reduced cognitive plasticity. During the task, low motor skills, and visual–motor coordination were observed in the child. Many errors in the second (B) attempt result from disturbed executive functions (difficulties in inhibiting the previously learned reaction) and the inability to search visually, rather than from split attention (function preserved).

Clinical trials. The planning process was examined using labyrinths in CFT 1-R tests (8 correctly performed of the expected 15), WISC-R (RR = 4, slightly below average). Verbal operating memory was verified using the Letter–Number Sequencing subtest of WISC-R (directly: 3, backward: 2, below average).

Using a clinical trial of the author's, the ability to smoothly change strategies was tested: starting from simple tasks with content, one modification was introduced, before waiting for the patient's action (ten attempts were made). Results: 1) a tendency was observed to perform the task in accordance with the first strategy (correct in the first sample, inadequate in the next); 2) there was difficulty in correcting errors after receiving feedback from the researcher; and 3) the patient denied that difficulties had occurred and that wrong answers had been given.

The indirect role of executive functions can be deduced by means of the Rey–Osterrieth Complex Figure, which primarily examines visual–spatial organization, and the phonemic fluency in Verbal Fluency Test, requiring generation of words with the optimal amount of verbal information.

Rey–Osterrieth Complex Figure. On the basis of the qualitative assessment, the patient incorrectly placed elements on the global and detailed levels, lacking the general outline of the figure (type VI: reproduction to a known pattern; 8/18 points). After 3 minutes, there were no significant difficulties in recall (type VI; 7/18 points). Verbal Fluency Test. Both in terms of semantic (18 words generated in 1 minute) and phonemic (11 words generated in 1 minute) fluency, the results were normal for the age. In the phonemic fluency, five perseverance errors were committed, which suggests difficulties in switching from task to task.

Measurement of the efficiency of short-term memory and attention processes

In order to verify the efficiency of short-term memory, the BVRT, Benton Visual Retention Test (C version, A method) was used (4/10 patterns were correctly re-

produced, and 16 errors were made: 7 distortions, 3 relative size errors, 2 rotations, 2 perseverations, 2 displacements), as well as the RAVLT, The Rey Auditory Verbal Learning Test (results in subsequent samples A: 4/7/5/6/4; for the sample B: 0 words + 7 intrusions; after the B trial: 2 words + 1 intrusion; after 30 minutes: 3 words + 1 intrusion) Additionally, based on the clinical neuropsychology trials of Włodzimierz Łucki, memory processes (direct visual memory: 17/20, direct auditory memory: 16/54) and perception (visual: 17/17, auditory: 71/116) were tested.

To verify the efficiency of the attention process, the D2 Attention Assessment Test of Rolf Brickenkamp was used. The overall result (RR = 332), the sum of all errors (RR = 51), the percentage of errors (15.4%), and the general ability to perceive (RR = 281) suggest a reduced quality of work in the patient. The distribution of errors indicates a gradual increase in errors in the later attempts: the fewest errors were made in the first area (RR = 6), then in the middle area (RR = 22), and in the final area (RR = 23). Jumper's syndrome did not occur.

ASSESSMENT OF EMOTIONAL AND SOCIAL FUNCTIONING

On the basis of interviews with the child, observational data, drawing exercises ("Me", "Family", "School"), and clinical trials (regarding naming and recognizing emotions on the pictures), we found evidence for emotional lability, the ability to defer gratification, and correct recognition and naming of emotions (basic and complex). The girl has a strong relationship with her mother and is also characterized by high emotional sensitivity. Based on clinical trials involving the ordering of pictures showing different social situations, a slight decrease in the understanding of the situational context is suspected. Communicativeness is at the optimal level.

OBSERVATION OF THE CHILD DURING THE NEUROPSYCHOLOGICAL EXAMINATION

In the first stages of the examination, the patient's difficulties with emotional control (lability, overstimulation) and processing of attention were seen. During subsequent meetings, emotional and motivational functioning gradually improved. Due to the emotional instability of the child in the early stages of the study, the test tasks were preceded by conversation on general topics (related to interests, school, and home). The girl showed optimal motivation in performing the test tasks and clinical trials, and also preserved concentration on the tasks.

ANALYSIS OF RESULTS

In reference to the problem reported by the girl's mother, the results confirm the occurrence of cognitive disorders and accompanying emotional and social difficulties resulting from CNS dysfunction. The therapy carried out so far has not proven sufficiently effective to significantly reduce the child's difficulties in school. The three research questions are addressed below.

Research question 1: Are the intellectual functions developing harmoniously?

On the basis of the tests using standardized psychological tools, we may conclude that the intellectual functions present a nonharmonious profile. The results indicate a level of fluid intelligence ranging from a light degree of intellectual disability to lower-than-average intellectual abilities. Considering the significant difference in the results of tasks regarding visual–spatial and abstract abilities, it seems that the girl has both intellectual resources and deficits. Her resources include perceptual skills and perceptiveness, while her deficits include processes of inference, capture, recognition, and understanding of rules regarding the figural material. In terms of crystallized intelligence, the results point to the preservation of the potential of intellectual functions in the verbal (passive words) and numerical areas (capture and finding relations between numbers, accompanied by elementary skills in addition, subtraction, multiplication, and division).

Research question 2: What is the clinical image of the cognitive and executive disorders resulting from CNS dysfunctions in the course of autoimmune drug-resistant epilepsy?

Based on results and data from the literature (see Borkowska & Scholz 2010), we drew up a clinical image of memory, attention, and executive dysfunctions in the child. It can be concluded that executive dysfunctions occur in the area of planning, fluent switching from task to task (due to difficulties in inhibiting the previously learned or remembered reaction), in efficient selection, and in attempts to change strategies for solving the task. The results do not indicate the occurrence of attention deficits in the form of concentration or the general ability to perceive. This weakened level maintains, however, to the ability to switch attention and actively search visually—both aspects related to executive functions. The processes of short-term memory are not harmonious: direct visual memory is preserved (despite the weakened visual–spatial organization), while the direct auditory memory and the verbal operational memory are significantly reduced. The results also indicate significant difficulties in auditory perception, as part of auditory–verbal deficits. Data from the interview, observation, psychological and medical documentation, and the analysis of neuropsychological findings reflecting the current clinical image of cognitive and executive disorders in the child point to the occurrence of CNS dysfunction (especially in the frontal and temporal areas of the right hemisphere) as a result of childhood epilepsy.

Research question 3. Are there any emotional and social difficulties in the child?

Social and emotional development proceeded in a nonharmonious way. The ability to understand the emotional states of other people, to recognize and name emotions (basic and complex), to describe, and to explain various social situations are currently at the optimal level. There are still significant difficulties in

emotional control; due to her high sensitivity, there is a risk of reduced resistance to failures and of difficulties in the adequate use of assertive behavior.

DISCUSSION

Executive functions and other cognitive and emotional disorders in the patient indicate that there is a need to begin neuropsychological therapy (Pąchalska 2008; Prigatano 2009). Due to the key role of executive functions and verbal operational memory in the process of effective and independent learning, this article focuses on their detailed analysis. Referring to the criteria of Muriel D. Lezak (1995), the patient retains volition—such as motivation or readiness to perform tasks—while the significant difficulties concern other aspects: planning, purposive action, and effective performance.

The present research focuses on explaining neurocognitive disorders from the point of view of microgenetic theory using modern neurotechnology, such as quantitative electroencephalography (QEEG) and event-related potentials (Alipour, Seifzadeh, Aligholi et al 2017; Pąchalska, Kaczmarek & Kropotov 2014; Pąchalska, Góral - Półrola, Mueller et al. 2017; Sowndhararajan, Kim, Deepa et al 2018). Results from QEEG point to the presence of neuronal correlates of the clinical image of disorders in children with epilepsy (Ouyang, Chiang, Yang et al 2018; Lin, Ouyang, Chiang et al 2014), ADHD (Kropotov, Grin-Yatsenko, Ponomarev et al. 2005; Tye, Asherson, Ashwood et al., 2014), and ASD syndrome (Kozhushko, Nagornova, Evdokimov et al 2018). Other studies (Chan, Rolston, Rao et al 2018) have suggested improvements in cognitive function in people with drug-resistant epilepsy with the use of invasive neurostimulation methods, such as vagus nerve stimulation (VNS), deep brain stimulation (DBS), and responsive neurostimulation (RNS).

In the child examined here, impaired executive functions were seen in the form of difficulties in inhibiting previous reactions, which resulted in many perseveration errors. Figure 1 presents a scheme of the formation of perseveration errors in the microgenetic approach, which can serve as an explanation of how the errors arose in the girl.

The literature data ambiguously define and explain the type and severity of neurocognitive deficits in patients with autoimmune epilepsy (Dubey, Singh, Britton et al. 2017; Suleiman, Brilot, Lang et al. 2013; Wright & Vincent 2016). According to Goldberg-Stern and colleagues (2014), some patients suffer from attention and effective learning disorders—both of which may result from executive dysfunctions. In epileptic encephalopathy, there are global or selective cognitive and behavioral disorders that manifest in the child population in the form of Lennox–Gastaut syndrome (Covanis 2012; Vignoli, Oggioni, De Maria et al. 2017) and Landau-Kleffner syndrome (Covanis 2012). Cognitive disorders increase from 2 to 4 years of age, and in the school period tend to gradually improve in terms of, for example, visual–spatial dysfunctions, including reduced visual–motor coordination and visual–structural deficits (Tran & Zupanc 2017).

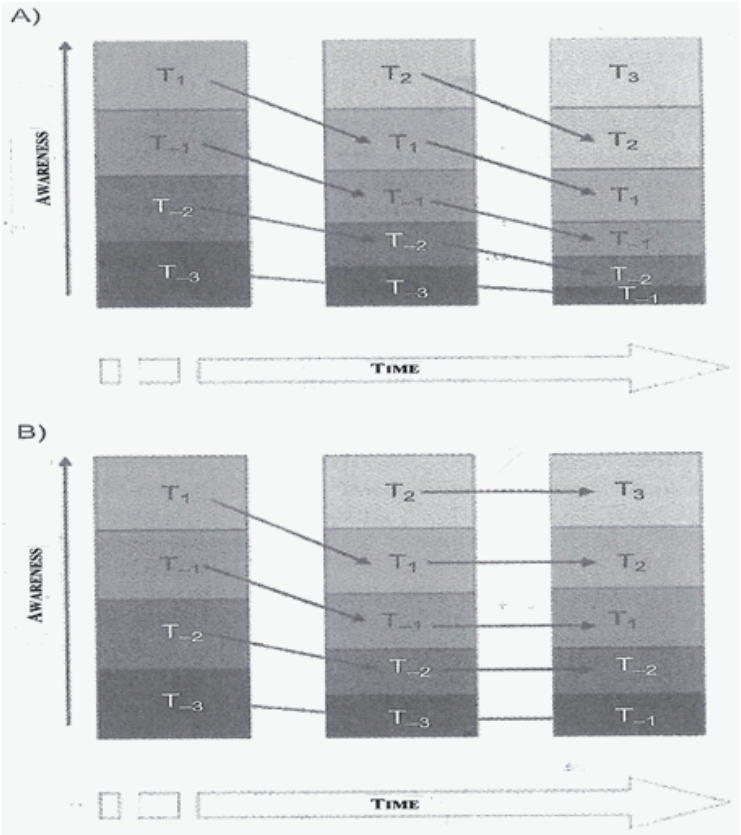

Fig. 1. Presence of novelty in microgenesis: (A) normal, (B) pathological. Pathology is associated with the appearance of perseveration: the lack of change to new modes of operation due to the lack of awareness of novelty. The squares represent a collection of memory and perceptual impressions in the present (T1, T2, T3) and in the past (T-1, T-2, T-3). In the pathology, with the passage of time, new elements do not appear in the present.
Source: Pąchalska, Kaczmarek, Kropotov (2014: 421)

In Lennox–Gestaut and Doose syndromes, executive dysfunctions and dyspraxia may occur (KiefferRenaux, Jambaque, Kaminska et al. 1997); both probably result from changes in the frontal lobes (ibidem; Parente, Manfredi, Villani et al. 2013). Treitz and colleagues (2009) considered how components of executive dysfunction relate to planning, selection of strategies, making corrections, and the weakened processes of maintaining attention and memory capacity.

Based on data from the literature on the results of medical (EEG) and neuropsychological research, we can conclude that CNS dysfunctions occur here in the central–temporal and temporal areas of the right hemisphere of the brain. The neuropsychological diagnosis data and the results of previous studies point to the occurrence of disconnection syndrome (Herzyk 2015; Walsh & Darby 2005).

CONCLUSIONS

1. The executive dysfunctions seen in the patient are among the key difficulties that have emerged or escalated as a result of autoimmune drug-resistant epilepsy.
2. The occurrence of cognitive (and emotional) disorders significantly hinders the process of effective learning during school, and can be expected to hinder her in the process of becoming independent in subsequent years. Focusing on the child's development during the school period in the (currently dominant) cognitive sphere, as well as in the emotional–motivational and social spheres, requires neuropsychological therapy or rehabilitation.
3. The aim of neuropsychological therapy is to improve disturbed mental functions that have arisen as a result of the dysfunction of the central nervous system, in order to equip the patient with the ability to effectively cope with new and difficult situations that require complex problems to be solved (Herzyk 2015).

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