

Executive Functions and Adaptive Behaviors in Adult Patients Diagnosed with Schizophrenia (part 2)

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Abstract

Introduction: *Patients diagnosed with schizophrenia present a level of impairment on a wide range of areas, such as cognition, memory, and adaptive mechanisms. Cognitive impairment, along with the degree of impairment of executive functions is a fundamental predictor of the degree of recovery and becomes a target in developing an intervention plan (Giraldo-Chica et al., 2017). However, despite the large number of years of study, the etiology and pathophysiology of schizophrenia are not fully understood, making treatment only modestly effective (Tandon et al., 2008).*

Objectives: *The purpose of this paper is to evaluate the degree of impairment of executive functions and adaptive mechanisms in order to better understand the nature and source of these deficits.*

Methods: *Research was conducted on a sample of 10 patients diagnosed with schizophrenia, aged between 30 and 60, of both genders – male (1) and female (9), who were selected by non-random sampling, volunteers receiving a set of questionnaires with early completion of the data processing agreement. The sample was extracted from 3 Psychiatric Hospitals in Bucharest, Romania. The degree of impairment of the participants was evaluated using the results obtained in the WCST (Wisconsin Card Sorting Test), D2 Attention Test, ABAS-II Test (Adaptive Behavior Assessment System) and MMS-2 Test (Mini Mental State Evaluation).*

Results: *The results indicated a severe impairment of executive functions and adaptive mechanisms, along with a moderate cognitive impairment. The general conceptual level of the subjects was placed in the severely affected performance range. Thinking processes were marked by perseverance in approaching a problem or situation, despite receiving negative feedback and continuing with it beyond the limit at which someone else would have sought another approach.*

Conclusions: *A future direction of research might be extending the number of participants in the study, in order to better evaluate the degree of impairment present in the targeted population. Better understanding the degree of impairment and extending existing research will offer a broader understanding in treating patients diagnosed with schizophrenia.*

Keywords: *schizophrenia, adaptive mechanisms, early trauma, Theory of Mind, cognition, memory, attention*

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(continued from previous number)

III. Results

Case 1

Name and surname: C.E.

Gender and age: 44, F

Date and place of birth: 1975, Ilfov County

Socio-professional status: not married, without children, classified with level 2 disability – accentuated functional deficiency, has worked in horticulture.

Diagnosis: Simple Schizophrenia, Discordant disorder, Behavioral disorder; the participant was diagnosed at 25 years old.

Overall presentation: the appearance indicates good hygiene and appropriate attire. Eye contact is present during the conversation, but the gaze seems lost. At the level of mimic and gestures affective flattening is observed; speech is not in accordance with the emotions expressed. The attitude is slightly aggressive, the voice tone is high, almost screaming when the patient recounts themes with an emotional charge. However, during the clinical interview she relaxed and became more cooperative. Thinking is affected and although the speech is structured, the vocabulary is simplistic and the sentences are brief. She describes that she enjoys caring for other patients, but when upset, she reacts aggressively towards the nurses, then repents and cries.

Family history and family relationships: the patient shares she comes from a family with 8 children. Her father died during her early childhood years, and she was entrusted to a foster home by her mother. In the foster home she described being sexually abused on multiple occasions, by both staff and peers. The first sexual abuse occurred when she was 12. She describes the relationship with her mother as tumultuous and remembers that, during childhood, whenever visiting her house, her mother used to physically assault her: “My mother used to beat me, hit me with whatever she could lay her hand on”. The patient states that she has had a cohabitation relationship with a man who would also physically and sexually assault her. About the siblings, she appreciates they are “lucky” because they live with their mother. The interview ends with her contemplating at the life she would have had if she had not been into foster care: “If I could grow up with my mother we would have never met in here.”

MMS-2: the result obtained in the MMS-2 test indicates a moderate cognitive impairment. Although she did not encounter difficulties in the questions aimed at Orientation (obtaining raw scores of 4/5 and 5/5

respectively), she had difficulties in the task of Recall (gross score 2/3) and in the area of Attention and calculation (where she obtained a gross score of 1/5).

D2 Attention Test: the results obtained in the D2 Attention Test indicate the presence of O Syndrome (NT score = 366 / E% = 74.86), which reveals an inappropriate understanding of the instructions, but especially a superficial and imprecise processing of things. Thus, the score obtained falls into the quartile Q4e. Although she finished the test very rapidly (NT = 366), the number of errors (E = 274) is very high, 74.86% of the total responses, which reveals a low attention in processing stimuli. Concentration performance is low (CC = 21), within the Q1e interval, indicating an interval that represents poor scores (10%). The results indicate concentration disorders, the subject being inattentive and distracted during completion.

WCST: the results obtained in the WCST Test indicate severe difficulties at the level of executive functions. The subject was given a number of 69 samples, without successfully completing any category. It is found in 57.8% in clinical patients, and in 14.2% in the normal group. The general conceptual level of the subject (standard score 16 on the Conceptual Level Answers scale) places her in the severely affected performance range. The score is below the expected level, compared to the adult population. This is supported by the scores obtained on the Number scale. The total of correct answers (gross score = 24), together with the score obtained on the Perseverative responses scale (gross score = 9), indicating that the percentage of correct answers also consists of answers in which the subject did not alternate several sets of solving, showed a pervasive behavior, without understanding at a logical and conceptual level the dynamics of the answers. The total number of errors (gross score = 88) reveals a classification in the problematic performance range, 54.2% of the clinical group obtaining similar results. Scores could not be calculated for the scale Learning to Learn, due to the inability to complete any category.

ABAS-II: the results obtained in the ABAS-II test indicate very low adaptive abilities (GAC score = 13), being at a number of 5 standard deviations from other people of the same age and falling in the < 0.1 percentile, which reveals that she obtained a score as high as less than 0.1% of the population of the same age. The scaled scores of the three Skill Areas (Conceptual scaled score = 4, Social scaled score = 2, Practical scaled score = 7) are also at the percentile level < 0.1. It indicates that the participant has very low-level abilities on all skill areas, except the Home Living (scaled score

= 8) where the impairment is average. The Work scale was not calculated, taking into account that the subject was not working at the time of completing the testing.

Case 2

Name and surname: D.L.

Gender and age: 59, F

Date and place of birth: 1960, Ilfov County

Socio-professional status: divorced, retired nurse (due to illness), hospitalized, without children.

Diagnosis: Chronic Paranoid Schizophrenia, classified with level 5 disability – accentuated, permanent invalidity. She is permanently hospitalized in a psychiatric hospital; under medication; diagnosed at 30 years old.

Overall presentation: The appearance is neat, with hospital clothing, but clean and in accordance with the season and indoor temperature. The posture during conversation is rigid, the participant is not expressing any feelings. The tone of her voice is whispered and devoid of modulation.

Family history and family relationships: The disorder set in around the age of 30, after her marriage ended, due to potential infidelity from the spouse's side. A series of hospitalizations in psychiatric hospitals followed, she retired from work, due to illness, obtaining disability pension, and afterwards ended up living on the street for a period of time, due to the fact that she did not have a good relationship with the family. She has a relationship with another patient, who is physically abusive.

MMS-2: the result obtained in the MMS-2 test indicates a slight cognitive impairment. Although a slight cognitive impairment is seen in questions that aimed Orientation (obtaining a gross score of 4/5), she had difficulties with the Recall task (gross score 1/3).

D2 Attention Test: the results obtained in the D2 Attention Test indicate the presence of Syndrome O (NT score = 615 / E% = 31.7), and reveal an inappropriate behavior to the instructions or a superficial and imprecise processing of the stimuli. It is clear that she passed the test very fast (NT = 615), the number of errors (E = 195) was very high, 31.7% of the total answers, which reveals a low attention in processing stimuli (CC = 91), within the range Q1. The completion was superficial, leading to a large number of mistakes. The results indicate that the subject is impulsive.

WCST: the results obtained in the WCST Test indicate severe difficulties at the level of executive functions. The subject was administered a number of 108 samples, without successfully completing any category. Thus, using the percentage data, we can specify that this

score is found in 57.8% of clinical patients, and in 14.2% of the general population group. The general conceptual level of the subject (standard score 15 on the Conceptual Level Responses scale) places her in the severely affected performance range, the score being below the expected level, compared to the adult population. The subject began to persevere in Number and Form (gross score Perseverative errors = 41) and presented great difficulties in generating alternative solutions to problems. Thinking appears to be persevering, addressing a problem or situation in an inappropriate manner and continuing with it beyond the limit at which someone else would have sought another solution. This fact is supported by the scores obtained on scale Total number of correct answers (gross score = 39), together with the score obtained on the Perseverative responses scale (gross score = 18), indicating that the percentage of correct answers also consists of answers in which the subject did not alternate several sets of solutions, but showed a pervasive behavior, without understanding logically and conceptually the dynamics of the answers. The total number of errors (gross score = 69) reveals a classification in the problematic performance range, 54.2% of the clinical group obtaining similar results. Taking into consideration the fact that the participant did not complete any category, the scores for Learning to Learn could not be calculated.

ABAS-II: the results obtained in the ABAS-II test indicate very low adaptive abilities (GAC score = 14), being at a number of 5 standard deviations from other people of the same age and falling within the < 0.1 percentile, which reveals that the participant obtained a score as high as less than 0.1% of the population of the same age. The scaled scores of the three Skill Areas (Conceptual scaled score = 3, Social scaled score = 2, Practical scaled score = 9) are also at the percentile level < 0.1. The result obtained at the composite scale Practical (scaled score = 9) falls in the percentile < 0.2. The subject displays low level in all skill areas, except the Self-Care area (scaled score = 5), where the adaptive skills are lower. The Work scale was not calculated, taking into account that the subject was not working when completing the form.

Case 3

Name and Surname: L.I.

Gender and age: 58, F

Date and place of birth: 1961, Bucharest

Socio-professional status: divorced, without children, factory worker, disability level 5, graduate of a vocational school.

Diagnosis: Paranoid Schizophrenia, under treatment. Unknown diagnostic age.

Overall presentation: the appearance is untidy, the clothes are clean but torn. The posture is bent, the emotional flattening is visible. Engaging in eye contact is deficient, the gaze is fixed at a point behind the person she is addressing to. It feels as if the participant is talking to someone who is not present, whispering. The attitude is ambivalent, alternating between periods of assertiveness and aggression. The participant presents delusional ideas of persecution and auditory hallucinations during the consultation.

Family history and family relationships: all family members are deceased. She avoids talking about her family. Towards the end of the interview, the patient takes a piece of paper and writes "I miss home".

MMS-2: the result obtained in the MMS-2 test indicates a moderate cognitive impairment. Although she did not encounter difficulties in the questions regarding Orientation (obtaining raw scores of 4/5 and 4/5 respectively), she had difficulties in the task of Recording (obtaining a gross score of 1/3) and at the Reminder task (obtaining a gross score of 2/3), which may indicate mnemonic impairment.

D2 Attention Test: the results obtained in the D2 Attention Test indicate the presence of O Syndrome (NT score = 466 / E% = 43.56), which reveals an inappropriate behavior to the instructions, especially a superficial and inaccurate processing of stimuli. Although she completed the test very quickly (NT = 466), the number of errors (E = 263) is very high, a total of 43.56% of the total responses, which reveals low attention in processing stimuli. Concentration performance is low (CC = 20), falling within the Q1e interval, indicating low scores (10%). The results indicate concentration disorders, the subject manifesting inattentively and impulsively.

WCST: the results obtained in the WCST Test indicate severe difficulties at the level of executive functions. The subject was administered a number of 100 samples, without successfully completing any category. Thus, using the percentage data, we can say that this score is encountered in 62.2% in the Clinical Frontal plus group, and 14.2% in the general population group. The general conceptual level of the subject (standard score 10 on the Conceptual Level Responses scale) places her in the severely affected performance range. This score is below the expected level, compared to the adult population. The subject began to persevere in Number and Form (gross score Perseverative errors = 39) and presented great difficulties in generating alternative solutions to problems. Thinking appears to be persevering, the participant wrongly approaching a

problem or situation and continuing with it beyond the limit at which someone else would have changed the approach. This fact is supported by the scores obtained on the scale Total number of correct answers (gross score = 34), together with the one obtained on the Perseverative responses scale (gross score = 12), indicating that the percentage of correct answers also consists of answers in which the subject did not alternate several sets of solutions, but showed a pervasive behavior, without logically and conceptually processing the dynamics of the answers. The total number of errors (gross score = 66) reveals a classification in the problematic performance range, 54.2% of the clinical group obtaining similar results. The scores for Learning to Learn could not be calculated due to the subject's inability to complete a category.

ABAS-II: the results obtained in the ABAS-II test indicate very low adaptive abilities (GAC score = 9), falling in the < 0.1 percentile, which reveals that she obtained a score as high as less than 0.1% of the population of the same age. The scaled scores of the three Skill Areas (Conceptual scaled score = 3, Social scaled score = 2, Practical gross score = 4) are also at the level of the percentile < 0.1. The results indicate very low-level skills in all areas of competence. The Work Scale was not calculated, taking into account that the subject was not working at the time of completing the form.

Case 4

Name and Surname: G.R.

Gender and age: 53, F

Date and place of birth: 1966, Bucharest

Socio-professional status: not married, without children, classified as disability level 5, graduated from high school, did not work.

Diagnosis: Schizophrenia, Depressive disorder, Schizoaffective disorder, Hetero-aggressive behavioral disorder; the first diagnosis occurred at 20 years old.

Overall presentation: the speech is poor, she stutters and starts any sentence with "Well, I say...", referring to herself in third person. The responses are dichotomous. The apparel is appropriate and clean.

Family history and family relationships: she says she was hospitalized as a result of the tumultuous relationship with her siblings, who hospitalized her immediately after her parents died. They come and visit her once a year.

MMS-2: the result obtained in the MMS-2 test indicates a serious cognitive impairment. The areas in which she encountered difficulties were those of Attention and calculation (where he obtained a gross

score of 1/5), together with Memory and Recall (where he got a gross score of 1/3 and 0/3, respectively). The results indicate an impairment both in cognition and in memory and prosexic functions.

D2 Attention Test: the results obtained in the D2 Attention Test indicate the presence of O Syndrome (NT score = 486 / E% = 50.2), which reveals a superficial and inaccurate processing of stimuli. Therefore, the score obtained at E% falls into the quartile Q1e, falling in the range of the weakest 10%. Although the patient completed the test very fast (NT = 486), the number of errors (E = 244) remains high, 50.2% of the total answers, which reveals a low attention in processing the stimuli. Concentration performance is low (CC = 37), within the range of Q1e, indicating an interval that represents low scores (10%). The results indicate impulsivity, concentration disturbances, and a tendency to go over the task with high speed, but with little focused attention.

WCST: the results obtained in the WCST Test indicate severe difficulties at the level of executive functions. The subject was administered all the samples, that is 128, without successfully completing any category. By using the percentage data, we can say that this score is found in 62.2% in the Clinical group, and in 14.2% in the normal distribution group. The general conceptual level of the subject (standard score 0 on the Conceptual Level Responses scale) places her in the severely affected performance range. This score is below the expected level, compared to the adult population, revealing a severe impairment of executive functions. The subject began to persevere in Form (gross score Perseverative Errors = 46) and presented great difficulties in generating alternative solutions to problems. This is supported by the scores obtained on the scale Total number of correct answers (gross score = 34), along with the score obtained on the Perseverative responses scale (gross score = 17) indicating that the percentage of answers correct consists of answers in which the subject did not alternate several sets of solutions, but showed an indiscriminate behavior, outside of logical and conceptual understanding of the dynamics of the answers. The total number of errors (gross score = 94) reveals a classification in the severe performance interval, 54.2% of the clinical group obtaining similar results. The researcher could not calculate scores for Learning to learn due to patient's inability to complete any category.

ABAS-II: the results obtained in the ABAS-II test indicate very low adaptive abilities (GAC score = 15), being at a number of 5 standard deviations from

other people of the same age and falling in the < 0.1 percentile, which reveals that the respondent obtained a score as high as less than 0.1% of the population of the same age. The scaled scores of the three Skill Areas (Conceptual scaled score = 3, Social scaled score = 3, Practical scaled score = 9) are also at the level of the percentile < 0.1. The result obtained at the composite scale Practically (scaled score = 9) falls in the percentile < 0.2, revealing that the participant obtained a score as high as less than 0.2% of the population. She presents abilities at a very low level in all skill areas, except for the Self-Care area (scaled score = 4), where adaptive skills are lower. The Work scale was not calculated, taking into account that the subject was not working at the moment of assessment.

Case 5

Name and Surname: B.M.

Gender and age: 60, F

Date and place of birth: 1959, Bucharest

Socio-professional status: divorced, classified with disability – level 5, graduated from high school, has worked in a printing house.

Diagnosis: Paranoid Schizophrenia, Behavioral disorder, Depressive disorder.

Overall presentation: the appearance is untidy, but maintains good hygiene. The visual contact is accurate. Has a tendency to verbally abuse others, manifests psychomotor agitation and prevalent ideation of prejudice. She declares that she can no longer bear her thoughts, that she is “ill with thoughts” and that the diagnosis is resulted “out of scares”.

Family history and family relationships: the disorder set in when the patient was 40 years old. At the age of 48 her parents died and she was institutionalized by her sister-in-law with whom she had an estranged relationship after her husband divorced her. According to her statement the family relationship was good: “they used to take us out to the confectionery, I miss them, I don't want to forget them”. She mentions that she also had a brother who died when she was 8 years old, run over by the train. She says she often thinks about him and what happened to him: “He's lost, he's scared, now he's a pool of blood after the accident”.

MMS-2: the result obtained in the MMS-2 test indicates a moderate cognitive impairment. The scores obtained indicate an impairment of the Orientation (obtaining a gross score of 1/5). Also, the result obtained in Attention and calculation (gross score of 0/5) are indicators of impairment of mnemonic and prosexic functions.

D2 Attention Test: the results obtained in the D2 Attention Test indicate the presence of O Syndrome (NT score = 418 / E% = 52.15), which reveals a superficial and inaccurate processing of stimuli. The E% score obtained falls into the quartile Q1e. Although the respondent completed the test very quickly (NT = 418), the number of errors (E = 218) is very high, 52.15% of the total responses, which reveals low attention in processing stimuli. Concentration performance is low (CC = 47), within the range Q1e, indicating a range that represents low scores (10%). The results indicate concentration and impulsivity disorders.

WCST: the results obtained at the WCST Test indicate severe difficulties at the level of executive functions. The subject was administered all the 128 samples, without successfully completing any category. Her score is found in the interval of 62.2% in the Clinical group, and in the measure of 14.2% in the adult population group. The general conceptual level of the subject (standard score 23 on the Conceptual Level Responses scale) places her in the severely affected performance range. This score is below the expected level, compared to the adult population, revealing a severe impairment of executive functions. The subject began to persevere in Form (gross score Perseverative Errors = 52) and presented great difficulties in generating alternative solutions to problems to which other individuals would have looked for different approaches. This is supported by the scores obtained on the scale Total number of correct answers (gross score = 43), along with the score obtained on the Perseverative responses scale (gross score = 22), indicating that the percentage of correct answers consists of answers in which the subject did not alternate several sets of solutions. The total number of errors (gross score = 85) reveals a classification in severe performance interval, 54.2% of the clinical group obtaining similar results. The scores for Learning to learn scale could not be calculated, as the respondent failed to complete any of the categories.

ABAS-II: the results obtained in the ABAS-II test indicate very low adaptive abilities (GAC score = 9), falling within the < 0.1 percentile, which indicates the patient obtained a score as high as less than 0.1% of the population. The scaled scores of the three Skill Areas (Conceptual scaled score = 3, Social scaled score = 2, Practical scaled score = 4) are also at the level of the percentile < 0.1, very low on all skill areas. The Work Scale was not calculated, taking into account that the subject was not enrolled in work at the time of assessment.

Case 6

Name and Surname: O.G.

Gender and age: 58, F

Date and place of birth: 1961, Tecuci, Galați County

Socio-professional status: divorced, with two children, classified in disability code 7 – accentuated functional deficiency; she used to work in a textile factory.

Diagnosis: Simple Schizophrenia, Severe depressive episode, Low intensity psychotic symptoms, diagnosed at 25 years old.

Overall presentation: the respondent has neat appearance, hospital attire, good hygiene. The eye contact is present during conversation. The ideational content is predominantly depressive. The attitude is submissive, has a high degree of suggestibility. Manifests anhedonia and declares that she does not get along with anyone.

Family history and family relationships: she states that she was hospitalized by her husband because she felt dizzy, had strange thoughts and heard voices in her head. Medical data indicate a severe depressive episode with residual psychotic symptoms, occurring in a psychotraumatic context – the death of her daughter. The participant declares that the relationship with the origin family was a good one, but at the present time both of her parents died. The discourse then becomes de-structured, shows flight of ideas and fixation on the number “2”.

MMS-2: the result obtained in the MMS-2 test reveals a moderate cognitive impairment, with difficulties with the Reading task (0/1 raw score) and in the Writing area (where she obtained a 0/1 raw score). This score indicates that there were difficulties in answering items referring to Orientation in space and time (raw score of 3/5, respectively 2/5).

D2 Attention Test: the results obtained at the D2 Attention Test indicate the presence of O Syndrome (NT score = 437 / E% = 48.51), which reveals a superficial and imprecise processing of stimuli. The E% score obtained falls into the quartile Q1e. Although it passed the test very quickly (NT = 437), there were numerous errors (E = 212), representing 48.51% of the total responses, which reveals low level of attention in processing stimuli (CC = 20), within the range Q1e, indicating an interval that represents low scores (10%). There is an obvious difference between the first half of the test and the second half, in terms of errors (Errors from half 1/ half 2: 78/ 134) revealing an ability to keep attention for short amounts of time. The results indicate disorders of concentration and impulsivity.

WCST: the results obtained at the WCST Test indicate severe difficulties at the level of executive functions. The subject was administered 68 tests,

without successfully completing any category. The low number of tests reveals a low tolerance for frustration and failure, the subject refusing to continue testing after that number of samples. Using the percentage data, we can state that such score, namely 0 completed categories, is found in 62.2% in the Clinical group, and in 14.2% in normal group. The general conceptual level of the subject (standard score 13 on the Conceptual Level Responses scale) places her in the range of severely affected performance. Such score is below the expected level, compared to the adult population, revealing a severe impairment of executive functions. The respondent began to persevere in Form (gross score Perseverative Errors = 23) and presented great difficulties in generating alternative solutions to problems. The error rate is 65%, indicating poor performance. As in previous cases, the scores for Learning to Learn could not be calculated, due to participant not completing any category.

ABAS-II: the results obtained in the ABAS-II test indicate very low adaptive abilities (GAC score = 9), falling within the < 0.1 percentile, which in this case also represent a score as high as less than 0.1% of the population of the same age. The scaled scores of the three Skill Areas (Conceptual scaled score = 3, Social scaled score = 2, Practical scaled score = 9) fall in the < 0.1 percentile. The participant has very low-level skills in all envisaged domains. The Work Scale was not calculated, taking into account the fact that the subject was not working at the time of assessment.

Case 7

Name and Surname: N.M.

Gender and age: 58, F

Date and place of birth: 1961, Vârteju Commune

Socio-professional status: not married, without children, has worked in a factory.

Diagnosis: Paranoid Schizophrenia, late-onset of discordant psychosis, diagnosed at 40 years old.

Overall presentation: the appearance is neat; the clothes are clean. Makes good visual contact. Mimicry and gestures are discordant in contrast with the speech, the look is suspicious. The cognitive function is visibly affected, the discourse is de-structured, the respondent presents delusional ideas of persecution and verbal motor hallucinations.

Family history and family relationships: the patient does not provide relevant data about the family, the information being delusional in content. She stated that the relationship with the family was marked by the family's desire to take her house and money. Abortion

is a main theme in every conversation, declaring that she was forced to have an abortion and so did her mother.

MMS-2: the result obtained in the MMS-2 test points out a moderate cognitive impairment. Although the participant did not encounter difficulties in the questions regarding Orientation (obtaining raw scores of 4/5 and 5/5), she had difficulties in the task of Reading (gross score 0/1) and to the areas of Attention and calculation (where she obtained a gross score of 0/5).

D2 Attention Test: the results obtained in the Attention Test D2 identify the presence of O Syndrome (NT score = 376 / E% = 74.73.51), which reveals a superficial and inaccurate processing of stimuli. The E% score obtained falls into the quartile Q1e. Again, this participant also finished the test very rapidly (NT = 376), the number of errors (E = 281) being very high, representing a percentage of 74.73% of the total answers, which further indicates low attention in processing stimuli. Concentration performance is low (CC = 11), falling within the range Q1e, indicating an interval that represents low scores (10%). There is a notable difference between the first half of the test and the second half concerning the number of errors (Errors in the middle 1 / half 2: 105/ 176), revealing an ability to maintain attention for shorter periods of time. Also, the number of substitution errors (E2 = 22) indicates a low ability to discern between similar stimuli. The results indicate disorders of concentration, inattention and a high degree of distraction.

WCST: the obtained results indicate severe challenges at executive functions level. The participant was administered all tasks, 128 in number, but could not complete either category. By comparing the obtained results with the distribution of scores, we may infer her score is found in 62.2% in the Clinical group, and in 14.2% in the adult population group. The error percentage (70%) indicates a low adaptation of executive functions. The general conceptual level of the participant (standard score 12 in Conceptual Level Responses scale) maintains her in the severely affected performance level. Such score is under the expected level, compared to adult population and reveals a severe alteration of executive functions. The participant persevered in Number and Shape (gross score Perseverative Errors = 70) and manifested significant difficulties in generating alternative solutions to presented problems. The reasoning process is marked by persevering, the participant incorrectly addressing an issue and continuing to use the approach in spite of inaccuracy. This is also supported by the scores obtained in Total Number of correct answers (gross score = 38),

as well as the Persevering Answers score (gross score = 27), pointing out that a significant percentage of correct answers was obtained as the subject did not alternate between several solution sets, but rather manifested a pervasive behavior, failing to logically and conceptually understand the answers dynamics. The scores for Learning to Learn could not be calculated, given the participant failed to complete any category.

ABAS-II: The results obtained in the ABAS-II test indicate very low adaptive abilities (GAC score = 17). The score falls within the percentile < 0.1, indicating that less than 0.1% of the population of the same age has had the same score. The scaled scores of the three Skill Areas (Conceptual scaled score = 3, Social scaled score = 2, Practical scaled score = 11) are also at the level of the percentile < 0.1. The result obtained on the composite scale Practical (scaled score = 11) falls in the percentile < 0.3. Also, the scores indicate very low-level skills in all skill areas, except the Self-Care area (scaled score = 7), where adaptive skills are inferior. The Work Scale has not been calculated, considering that the subject was not currently working.

Case 8

Name and Surname: G.P.

Gender and age: 57, F

Date and place of birth: 1962, Buzău, Buzău County

Socio-professional status: widow, graduated 12 classes, but did not work, has an adult son.

Diagnosis: Paranoid Schizophrenia, Behavioral disorder, diagnosed at 31 years old.

Overall presentation: the appearance is in order, the clothes are clean. The attitude is suspicious, uncooperative. She raises her voice during the assessment and punches the table while explaining the context of the hospitalization. She has delusional ideas of persecution and signs of hallucination, declaring that someone is stealing her thoughts. Compliance with treatment is low, she says she does not have to take pills because she only has a diagnosis of diabetes (she does not manifest awareness regarding the schizophrenia diagnosis).

Family history and family relationships: has a son which she does not acknowledge and accuses him of trying to steal her money. The patient states that she was brought to the hospital against her will. The documents attached to the patient's file reveal that the hospitalization took place after a complaint filed by a neighbor, a complaint which found that the patient previously threatened several neighbors with a knife, as she feared they wanted to steal her house. She was the wife of a pilot that had several affairs. At the moment of

assessment her son was not keeping contact with her anymore for about 3 years.

MMS-2: the result obtained in the MMS-2 test indicates a moderate cognitive impairment. Although the respondent did not encounter difficulties in the questions aimed at Orientation (obtaining raw scores of 4/5 and 4/5 respectively), she had difficulties in the task Recall (gross score 2/3) and in the task Attention and Calculation (gross score of 2/5).

D2 Attention Test: the results obtained in the D2 Attention Test (Score NT = 459 / E% = 57.51) reveal a superficial and inaccurate processing of the stimuli. Thus, the obtained E% score falls into the quartile Q1e. Although the participant completed the test with rapidity (NT = 459), the number of errors (E = 264) is very high, representing 57.51% of the total responses, which reveals a low attention in processing stimuli. Concentration performance is low (CC = 21), within in the Q1e interval, indicating an interval representing low scores (10%). Also, the number of substitution errors (E2 = 11) indicates a low ability to discern between similar stimuli and a high level of distraction.

WCST: the results obtained in the WCST Test indicate severe difficulties of executive functions. The subject was administered 88 tests, presenting a low degree of tasks completion, with a high percentage of failures. The participant's score is found in the interval of 62.2% in the Clinical group, and falls in 14.2% of the normal group distribution. The percentage of errors (61%) indicates a low adaptation of the executive functions. The general conceptual level of the subject (standard score 21 at the Conceptual Level Responses scale) places her in the range of severely affected performance. The score is below the expected level, compared to the adult population, revealing a severe impairment of executive functions. The subject began to persevere in the Form (gross score Perseverative Errors = 25) and presented great difficulties in generating alternative solutions to the problems. This fact is supported by the scores obtained on the scale Total number of correct answers (gross score = 34), which, along with the score obtained on the Perseverative responses scale (gross score = 16) indicate that even the correct answers were obtained when the subject did not alternate between several sets of solutions, but showed a pervasive behavior, without understanding in a logical and conceptual manner the dynamics of the answers. No category was fully completed.

ABAS-II: the results obtained in the ABAS-II test indicate very low adaptive abilities (GAC score = 12), falling within the < 0.1 percentile, which reveals

that she obtained a score as high as less than 0.1% of the population of the same age. The scaled scores of the three Skill Areas (Conceptual scaled score = 3, Social scaled score = 2, Practical scaled score = 9) fall in the < 0.1 percentile. The scores indicate low-level skills in all areas of skill. The Work Scale was not calculated, taking into account the fact that the subject was not working at the time of completing the form.

Case 9

Name and Surname: S.E.

Gender and age: 51, M

Date and place of birth: 1968, Bucharest

Socio-professional status: not married, without children, electronic engineer, graduate of the Polytechnical University of Bucharest.

Diagnosis: Paranoid Schizophrenia, diagnosed at 21 years old.

Overall presentation: the clothes are appropriate but the gaze is lost. Attention is distracted, the patient asks the researcher to repeat the questions during evaluation. He declares that he was at the top of his class before he began hearing voices, and the files offered by the hospital along with his parents' description, indicate that while being a student, he had above average cognitive abilities.

Family history and family relationships: the patient states that he lives with his mother, father, brother, grandmother and great-grandmother. He declares that the relationship with his mother is close. About his father, he states that he used to work as a colonel in the army and that he rarely saw him while growing up. He contracted hepatitis from his uncle when he was 6 years old. He states that his brother and father visit him often. He has stories of traumatic events that took place while he was in the army, although the files indicate he never enrolled in the army.

MMS-2: the result obtained in the MMS-2 test indicates a slight cognitive impairment. Although he did not encounter difficulties in answering questions which aimed Orientation in space and time (gross score of 4/5), Attention and calculations (gross score of 4/5), he had difficulties with the task of Copying (where he obtained a gross score of 0/1).

D2 Attention Test: the results obtained in the D2 Attention Test indicate the presence of O Syndrome (NT score = 537 / E% = 40.96), which reveals a superficial and inaccurate processing of stimuli. The E% score obtained falls within the Q1e quartile. The respondent also completed the task very fast (NT = 376), but the number of errors (E = 281) remains very high,

74.73% of the total responses, which reveals a low attention in processing stimuli. Concentration performance is low (CC = 11), falling within the range Q1e, indicating an interval that represents low scores (10%). The results indicate disorders of concentration, of attention and a high degree of impulsivity.

WCST: the results obtained in the WCST Test indicate severe difficulties at the level of executive functions. The subject was given 113 samples, without successfully completing any category. By using the percentage data, we can say that this score is found in the interval of 62.2% in the Clinical group, and in the rate of 14.2% in the general population group. The percentage of errors (62%) indicates a low adaptation of executive functions. The general conceptual level of the subject (standard score 22 on the Conceptual Level Responses scale) places him in the severely affected performance range, that is below the expected level, compared to the adult population, revealing a severe impairment of executive functions. The subject began to persevere in Number and Form (gross score Perseverative Errors = 41) and presented great difficulties in generating alternative solutions to problems, perseverating with the same approach to tasks. This is supported by the scores obtained on the scale Total number of correct answers (gross score = 43), along with the score obtained on the Perseverative responses scale (gross score = 41) indicating that the percentage of correct answers consists of answers in which the subject did not alternate several sets of solutions, but showed a pervasive behavior, without understanding at a logical and conceptual level the dynamics of the answers. No category was completed in its entirety.

ABAS-II: the results obtained in the ABAS-II test indicate very low adaptive abilities (GAC score = 13), being at a number of 5 standard deviations from other people of the same age and falling in the < 0.1 percentile, which reveals that obtained a score as high as less than 0.1% of the population of the same age. The scaled scores of the three Skill Areas (Conceptual scaled score = 4, Social scaled score = 3, Practical scaled score = 9) fall into the < 0.1 percentile. The score indicates low level skills in all areas of skill. The Work Scale was not calculated, taking into account that the subject is not working at the time of completing the form.

Case 10

Name and Surname: I.S.

Gender and age: 30, F

Date and place of birth: 1988, Bucharest

Socio-professional status: not married, graduate of a technical high school, without children.

Diagnosis: Schizophrenia, Major Depressive Episode; diagnosed at 25 years old.

Overall presentation: her clothes are clean and appropriate, but the mimic and gestures are discordant with the content of the conversation (she laughs when telling sad events and does not show joy when talking about desirable things). The speech is structured, but the voice is whispered and devoid of modulation. She says the voices are like “flames when someone is burned at the stake”. She states that she is dissatisfied with her appearance and that she is no longer interested in anything. Her main desire is to go home.

Family history and family relationships: the family consists of her mother and an elder brother. She states that she was abandoned by her father as a child. The patient describes that the relationship with her mother and brother are affectionate. After an attempt to take her life, she was hospitalized by her family. She lost contact with them and states that she no longer knows anything about them because they have never visited her since the attempt.

MMS-2: the result obtained in the MMS-2 test indicates a moderate cognitive impairment. The participant encountered difficulties in questions regarding Orientation in space and time (gross score of 3/5), Attention and Calculations (gross score 2/5) and Copying (gross score 0/1).

D2 Attention Test: the results obtained in the D2 Attention Test indicate the presence of O Syndrome (NT score = 372 / E% = 63.17), which reveals a superficial and inaccurate processing of stimuli. The E% score obtained falls into the Q1e quartile. The respondent accomplished the task very fast (NT = 372), the number of errors (E = 235) remaining very high, with 63.17% of the total responses, which reveals low attention in processing stimuli. Concentration performance is low (CC = 49), within the range Q1e, indicating an interval that represents low scores (10%). There is no obvious difference between the first half of the test and the second half, depending on the number of errors (Errors in half 1 / half 2 of the test: 111/ 124). Also, the number of substitution errors (E2 = 11) indicates a low ability to discern between similar stimuli. The results indicate disorders of concentration and a high degree of distraction.

WCST: the results obtained at the WCST Test indicate severe difficulties at the level of executive functions. The subject was administered 100 samples, without successfully completing any category. By using the percentage data, we can place this score in 62.2% of the Clinical group, and in 14.2% in the normal distribution group. The percentage of errors (64%) indicates a low

adaptation of executive functions. The general conceptual level of the subject (standard score 16 on the conceptual level) places the score in the range of severely affected performance. This score is below the expected level, in contrast with the adult population, revealing a severe impairment of executive functions. The subject began to persevere in Form (gross score Perseverative Errors = 38) and presented great difficulties in generating alternative solutions to problems. The thinking process is persevering, the respondent wrongly approaching a problem or situation and continuing with it beyond the point where another individual would have looked for another approach. This is supported by the scores obtained on the scale Total number of correct answers (gross score = 36), along with the score obtained on the Perseverative responses scale (gross score = 12) indicating that the percentage of answers also consists of answers in which the subject did not alternate several sets of solutions, but showed an indiscriminate behavior, seeming not to understand more profoundly the dynamics of the answers. The scores for Learning to Learn could not be calculated as the participant failed to complete any category.

ABAS-II: the results obtained in the ABAS-II test indicate very low adaptive abilities (GAC score = 13), falling within the < 0.1 percentile, which reveals that the participant obtained a score as high as less than 0.1% of the population of the same age. The scaled scores of the three Skill Areas (Conceptual scaled score = 4, Social scaled score = 2, Practical scaled score = 9) fall in the < 0.1 percentile. The respondent has very low-level skills in all concerned domains. The Work Scale was not calculated, taking into account the fact that the subject was not working at the time of completing the test.

IV. Discussion and conclusions

The degree of impairment of the participants was evaluated using the results obtained in the Wisconsin Card Sorting Test (WCST), D2 Attention Test, Adaptive Behavior Assessment System (ABAS-II) and Mini Mental State Evaluation Test (MMS-2), which were interpreted in the sample of 10 participants of research.

The scores obtained in the WCST test indicate a severe impairment of executive functions. The general conceptual level of the subjects is placed in the severely affected performance range. The cognitive function is persevering, the respondents incorrectly addressing a problem or situation and continuing like that beyond the limit at which someone else would have sought for another approach. The total number of errors was in the range of gross scores of 44 and 90. The number of samples applied was between 64 and 128, the participants not being able to

successfully complete any category. Comparing it to non-clinical patients, using the percentage data, we can state that such score is seen in clinical patients in 57.8% cases, and in 14.2% in the general population group.

The results obtained in the MMS-2 Test indicate a moderate cognitive impairment in 7 of the 10 participants, the gross scores ranging from 16-20. Two scores of mild cognitive impairment were recorded, the gross scores being between 25 and 26, respectively. Out of the group of 10 participants, the scores revealed a serious cognitive disorder in one of the participants, who had a gross score of 10.

In the D2 Attention Test, the participants obtained a percentage score of E% errors in the range of 31.7% and 74.86%, together with high scores on the NT scale (range 366-615), revealing a high speed of stimulus processing, but a processing that presents itself as superficial. Processing performance falls below the limit, revealing an inability to focus and concentrate attention on the task. The interpretation of the results indicates that the 10 participants have disorders of concentration, inattention and/ or impulsivity.

The adaptive abilities, measured with ABAS-II, indicate in the 10 research participants very low adaptive abilities, falling in the < 0.1 percentile. This fact reveals that they obtained a score as high as less than 0.1% of the population of the same age. The score of the three Skill Areas (Conceptual, Social and Practical) was in the percentile < 0.1, respectively < 0.2. The participants manifest significantly low-level skills in all measured areas, except for one participant with a lower score in the Family Skill Area, and two participants with a lower score in the Self-Care area.

We conclude that this research highlights the degree of impairment in terms of functioning in the areas of responsibility, of executive functions, and adaptive mechanisms, revealing a moderate-severe impairment in the adaptive behaviors and executive functions (confirming our first hypothesis). However, we cannot extrapolate the results, the research sample being reduced in number.

Also, the results indicating scores that reveal severe impairment in the area of adaptive mechanisms, along with moderate-severe impairment scores on the areas responsible for executive functions, pointing towards an influence of executive functions on the degree of impairment of adaptive mechanisms. Neither in the case of the second hypothesis, although confirmed, the results cannot be extrapolated, and the causal relationship cannot be considered to be statistically valid, given the small number of participants.

Although all patients described experiences with potential of being traumatic events, it was not possible to verify the validity of their statements, because, due to hospital policy, we could not get in contact with family members. Furthermore, most of them were missing documents from the hospital files, as a result of multiple hospitalizations. Nonetheless, it is important to take into consideration the effect environment had in the level of impairment presented by the present study. Abuse (sexual or physical), death of family members, homelessness, dysfunctional relationships, or being abandoned were some of the traumatic events described to have been experienced by patients. Also, most patients mentioned that they did not receive visits from family members, some regretting that they no longer lived home with them. Emotional regression was also visible, most patients seeking a parental figure in the medical staff, addressing them with "mommy" and asking for money or sweets, asking to be hugged or, in some cases, even to be taken home by them. The lack of social interaction with their families, alongside the fact that, during winter, patients were not allowed to go outside in the yard led to a visible deterioration in their condition, according to hospital staff. In the absence of structured activities, occupational therapy, individual or group therapy, the state of the patients declines.

Limitations

The first limitation of the research is given by the fact that some patients have a medical diagnosis that can influence the proper functioning of executive functions as a result of alterations in the functioning of the brain areas.

It is also important to note that the results of this study cannot be extrapolated, given the reduced number of participants. Also, the number of subjects who represented the research group was not divided equally by gender, only one participant being male.

At the same time, it is necessary to specify that the patients were under medical treatment, at the time of the clinical interview, which may interfere with the results obtained.

The participants were chosen based on their consent to participate in the research, with patients either refusing to participate after all, or accepting but giving up during the evaluation, most often as a result of paranoid delusions. We can thus assume that this aspect represents a limitation of the research, given that it is possible that participants who accepted the test have a lower degree of impairment and a better level of

adaptation, due to the ability to assess the environment as not being hostile.

Future research directions

A future direction of research might be extending the number of participants in this study in order to evaluate the degree of impairment present in the targeted population. Better understanding the degree of impairment and extending existing research will offer a broader understanding in treating patients diagnosed with schizophrenia.

Another potential future direction of the research involves the implementation of a program for the rehabilitation of executive functions, which will target, through the test-retest method, the extent to which the program has influenced the degree of deterioration of executive functions.

Also, a possible direction of research could be the evaluation of the Theory of Mind in relation to the degree of adaptation and the degree of impairment of adaptive mechanisms.

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