„CAROL DAVILA" UNIVERSITY OF MEDICINE AND PHARMACY
BUCHAREST
DOCTORAL SCHOOL
MEDICINE

ANALYSIS OF EXECUTIVE FUNCTIONS IN ADOLESCENTS WITH SUICIDAL OR NON-SUICIDAL SELF-HARMING BEHAVIOR

DOCTORAL THESIS SUMMARY

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The fundamental problem

Adolescence is a critical period for mental health, and experiences during this stage can influence long-term emotional and social balance. Approximately half of adult mental health conditions originate in adolescence, and early identification and treatment of vulnerable young people is a global priority (Schlack, 2021; Solmi, 2022; WHO, 2024). Suicide is one of the leading causes of mortality among adolescents, and 14% of young people aged 10–19 experience mental health problems, many of which remain undiagnosed. The most common disorders are anxiety and depression, and suicide occupies an alarming place in global statistics (Schlack, 2021; Silva, 2020, Scheiner, 2022; CDC, 2022; WHO, 2024).

Non-suicidal self-injurious behaviors (NSSI) are increasingly common, reflecting a growing need for understanding and clinical intervention. These behaviors are recognized in the "DSM-5" as a research diagnosis, highlighting the growing interest in studying and addressing the phenomenon (APA, 2013). More and more adolescents are being evaluated in pediatric psychiatric services due to disruptive behaviors, such as oppositional behavior, aggression, inability to complete tasks, as well as non-suicidal self-harming behaviors, suicidal attempts, or suicidal ideation. Executive function (EF) deficits are proposed as a possible explanatory factor for these behaviors. EF plays an essential role in emotion regulation, decision-making, and organization, and its deficiencies may contribute to the development of suicidal or non-suicidal self-injurious behaviors.

I. General part

Chapter 1. Suicidal and Non-Suicidal Self-Harming Behavior: Particular aspects in adolescents

Adolescence, a transitional stage between childhood and adulthood, significantly influences long-term mental health. Anxiety and depression are the most common disorders, and suicide is among the leading causes of death among young people between the ages of 15 and 19, as well as the third leading cause of death among those between the ages of 15 and 29 (Scheiner, 2022; CDC, 2022). Promoting socio-emotional development and adequate access to

mental health care are essential to protect adolescents from risks and ensure a healthy transition to adulthood.

1.1. Definitions and epidemiology

Suicidality includes thoughts and actions related to a person's desire to cause their own death, and suicide is the intentional act of fatal self-harm. Suicide attempts can be abandoned or unsuccessful, and parasuicide refers to dangerous behaviors without suicidal intent (Rey, 2019). The term "Non-suicidal Self-Injury" (NSSI) defines deliberate acts of self-harm without suicidal intent, and is recognized as a research diagnosis in DSM-5 (APA, 2013). NSSI is common in adolescence, a vulnerable period for the development of mental health problems (Whitlock, 2014). Studies show that between 13% and 17% of young people experience self-harm, and in clinical groups the percentage can reach 50% (Swannell, 2014; Glenn, 2013; Groschwitz, 2015). The frequency of NSSI is higher in girls than in boys and increases between 15 and 17 years of age, with a progressive decrease in adulthood (Brown, 2017; Moloney, 2024; Andrei, 2025). NSSI is also associated with an increased risk of suicidality, being the second cause of death among adolescents. Research on this phenomenon is essential for the development of suicide prevention strategies in young people (Campisi, 2020).

1.2. Assessment, clinical presentation, and comorbidities

The most common forms of NSSI include cutting, hitting, scratching, and burning, and the main reported motives are emotion regulation, self-punishment, and stress management (Andrei, 2024; Edmondson, 2016). Research suggests that individuals who engage in NSSI have difficulties in emotional regulation and exhibit increased susceptibility to anxiety and depression (APA, 2013; Moran, 2012; Plener, 2015). As the number of patients engaging in self-injurious behaviors has increased in recent years, there has been a constant need to develop appropriate assessment tools for these behaviors. However, currently available research tools for assessing these acts are still scarce.

1.3. Depressive disorders and self-harm in adolescents

Adolescents who engage in self-harm are at increased risk for depressive disorders, and suicide attempts among them are a major concern. Gender differences significantly influence suicidal tendencies, and girls have begun to use more lethal methods. Depression in adolescence has become increasingly common, with an alarming increase in suicide rates (Hausman, 2018; Miller, 2021). Depressive symptoms appear earlier in girls than in boys, and the prevalence of

depressive disorders almost doubles between the ages of 13 and 16. Adolescent girls are twice as likely as boys to experience severe depressive episodes (Khesht-Masjedi, 2017). Boys tend to have an earlier onset and a more severe course, while girls are at higher risk of suicidal ideation (Barendse, 2020; Dell'Osso, 2021). These aspects highlight the need for early intervention and the development of tailored treatment strategies.

1.4. Personality development, impulsiveness, and self-harming behavior in adolescence

Adolescence is a crucial stage in brain development, characterized by neuroplasticity and the remodeling of neural connections. During this period, the prefrontal cortex, responsible for executive functions, matures slowly, while the limbic system, involved in the processing of emotions, is highly active, which may explain impulsiveness and increased sensitivity to rewards and risks. Identity formation and personality development are influenced by multiple factors, and personality disorders can emerge in adolescence (De Luca, 2023; Best, 2021; Galván, 2021; Buică, 2022). Impulsiveness (impulsivity) is a significant characteristic in adolescence, being associated with non-suicidal and suicidal self-harming behaviors. The relationship between impulsiveness and suicidality is complex, with significant gender differences (Auerbach, 2017; Lockwood, 2017).

1.5. Impact of the COVID-19 Pandemic

The COVID-19 pandemic has had a significant impact on the mental health of adolescents, accentuating symptoms of stress, anxiety, and depression (Andrei, 2022; Bera, 2022). Adolescents with pre-existing mental disorders were the most vulnerable to the crisis, and the accumulation of stressors favored the increase in suicidal and non-suicidal self-injurious behaviors (NSSI) (Bera, 2022; Stańdo, 2021). Studies suggest that the impact of the pandemic on adolescent mental health varied depending on individual conditions and access to support, highlighting the importance of tailored interventions to prevent suicide and deterioration of psychological states (Lantos, 2022).

Chapter 2. Executive functions – physiological and pathological aspects in adolescence

2.1. Profile of executive functions in adolescents

Adolescence is a transitional stage marked by significant brain changes, with an imbalance between the systems involved in rewards and emotions, which mature early, and the prefrontal cortex, responsible for executive functions, which develops later. These functions include inhibition, cognitive flexibility, planning, and working memory, which are essential for decision-making and self-regulation. Executive dysfunction may contribute to impulsivity, risk-taking, and vulnerability to psychological distress. Studies suggest that adolescents exhibit executive capacity similar to adults, but are more influenced by emotional content, which may affect decision-making and emotional self-regulation, factors strongly implicated in the emergence of self-harming behavior (Alberman, 2023; Mihailescu, 2022).

2.2. Implications of executive functions in depressive disorders

Executive dysfunction (ED) is a cognitive deficit frequently encountered in various neuropsychological disorders, including pediatric depression. Although most studies examine ED in the context of neurodevelopmental disorders such as autism and ADHD, there is evidence that impaired executive function (EF) may influence symptoms of depression in adolescents (Vance, 2021). Furthermore, EF deficits are more pronounced in adolescents with borderline personality traits, which may exacerbate the severity of psychopathology and self-harming behavior (Alberman, 2023; Ortuño-Sierra, 2020)

2.3. The relationship between executive functions and suicidal and non-suicidal self-harming behaviors

In cases of adolescents who engage in self-harming behaviors, impaired cognitive functions, such as working memory and inhibitory control, may contribute to the maintenance of this behavior (Fikke, 2011; Dixon-Gordon, 2014). Impulsivity is an important predictor of suicide attempts in adolescents, being observed more frequently in females (Loyo, 2013). Furthermore, cognitive deficits, including attentional control and working memory, play a significant role in suicidal ideation and behavior. Meta-analyses highlight that cognitive control processes are vulnerability factors for suicide, and early detection of executive dysfunction in adolescents with self-injurious behaviors could contribute to suicide prevention and the development of effective therapeutic strategies (Ortuño-Sierra, 2020).

II. Personal contributions

Research Hypothesis

The working hypothesis underlying the study conducted in this paper refers to the fact that there is an impairment of executive functions (EF) in adolescents with normal levels of intelligence who present suicidal or non-suicidal self-injurious behavior. We formulated this hypothesis to identify a potential response to the general goal of outlining a profile of adolescents who engage in such behaviors and, specifically, to identify potential predictive factors of them. The relevance of assessing executive functions and determining their impact on the specific symptomatology of adolescents involved in self-harming behaviors lies in the significant risk of disability associated with executive dysfunctions, in association with the major risk of suicide in adolescents who resort to self-harm.

To support the validity of the research hypothesis, the study was structured around two general objectives, each accompanied by a series of specific objectives.

Research objectives

General objectives

1st General Objective: Analysis of the typology of adolescents with suicidal or non-suicidal self-harming behavior and with normal intelligence level

Specific objectives:

1. Identification of clinical profile and gender differences in adolescents with depressive disorders and suicidal or non-suicidal self-harming behaviors fro

2. Analysis of suicidal and non-suicidal self-harming behaviors in a clinical population

3. Subjective assessment of executive functions in a clinical group of adolescents with suicidal or non-suicidal self-harm behavior compared to a control group composed of subjects without diagnosed mental disorders

2nd General Objective: Analysis of executive functions in adolescents with suicidal or non-suicidal self-harming behavior with normal intelligence

Specific objectives:

1. Objective assessment of executive functions in a clinical group of adolescents with suicidal or non-suicidal self-harming behavior compared to a control group made up of healthy subjects,

by analyzing the results obtained in a series of computerized neuro-cognitive tests for the assessment of executive functions

2. Determination of the level of concordance between subjective and objective methods of assessing executive functions in the two studied groups

3. Evaluation of the existence of a correlation between self-harm, executive dysfunctions and impulsivity

Research methodology

Participants data

We conducted an analytical, non-experimental, case-control design study of executive dysfunctions in adolescents with self-injurious behavior on a group of 160 subjects divided into two groups. The study group consists of 100 adolescent participants aged between 13-17 years, who presented self-injurious behaviors, either for non-suicidal purposes, or with suicidal intent, or for both purposes, selected from patients admitted to the Pediatric Psychiatry Clinic of the ”Prof. Dr. Al. Obregia” Clinical Psychiatry Hospital, during the period 2019-2023. The study was conducted in accordance with the Declaration of Helsinki, and approved by the Prof. Dr. Al. Obregia Clinical Psychiatry Hospital Ethics Committee (protocol code 3292). The control group (control group) consists of 60 healthy adolescent subjects, aged between 13-17 years, without a diagnosis of mental disorder – at the time of the evaluation or in the antecedents.

In order to achieve one of the specific objectives, namely to identify the clinical profile and gender differences in cases of adolescents with depressive disorders and suicidal or non-suicidal self-harming behavior, data were collected from a clinical population represented by patients hospitalized in the pediatric psychiatry clinic at the "Prof. Dr. Al. Obregia" Clinical Psychiatric Hospital in Bucharest, diagnosed with depressive disorders, who, due to the potential associated risk of presenting self-harming behaviors, were initially identified as possibly eligible to be included in the main study group.

Considering the inclusion and, respectively, exclusion criteria (mainly the exclusion of diagnoses from the Autism Spectrum or Depressive Episodes with Psychotic Elements category), the availability of the patients to participate in the study and the need to obtain consent from their legal representatives, only a part of them were included in the final group. However, the data collected from the entire group were analyzed to examine the clinical profile, as well as to identify any specific differences between female and male patients. Due to the non-

experimental design of this study, the participation of the subjects did not involve any risk to their physical or mental health. The collection of all data was carried out during the period 2019-2024. All data collected about the patients were recorded under individualized codes, to maintain the confidentiality of the participants. Since the subjects are between the ages of 13-17, the informed consent of the parents (legal representatives) of the participants was obtained for participation in the study. The implementation of the study and the research methodology were in accordance with current ethical norms, in accordance with the Declaration of Helsinki, ensuring the protection of personal data and the confidentiality of the participants. For a period, this research benefited from financial support through the project "Net4SCIENCE: Doctoral and postdoctoral research network applied in the fields of smart specialization Health and Bioeconomy", SMIS code: 154722, contract no. POCU/993/6/13/154722, project financed by the European Social Fund, through the Human Capital Operational Program 2014-2020.

The selection of participants from the two groups (study group and, respectively, control group) was based on the following eligibility criteria:

- Study group

- inclusion criteria: patients from the Pediatric Psychiatry Clinic - “Prof. Dr Alexandru Obregia” Clinical Psychiatric Hospital who present suicidal/non-suicidal self-harming behavior, aged ≥ 13 years at the time of inclusion in the study, diagnosed according to ICD-10 criteria (WHO, 1993) with: Depressive episode, Depressive disorder, Depressive episode in bipolar disorder; in the case of non-suicidal self-harming behavior and suicidal ideation: their presence in the last year; in the case of suicide attempts - presence after the age of 12; intelligence quotient (IQ) > 70; written consent to participate in the study, both from the patient and one of the parents (legal representative)
- exclusion criteria: depressive episode associated with somatic disorders; sensory or motor impairment that could influence the ability to perform computerized tests; substance abuse in the last year; associated comorbidities at the time of inclusion in the study: Acute psychotic episode, Current depressive episode with psychotic elements, Schizophrenia, ADHD, Autism Spectrum Disorder, Mental retardation (IQ < 70); refusal of the patient/legal guardian to participate in the study (failure to sign the informed consent); refusal of the participant/legal guardians to participate in the study (failure to sign informed consent)

- Control group

- inclusion criteria: adolescents without psychiatric pathology at the time of inclusion in the study or in the antecedents - recruited from the general population; age ≥ 13 years at the time of inclusion in the study; gender and age matching with the subjects in the study group;

Study instruments, questionnaires, and analysis procedure

Demographic and general data of the subjects were collected using a questionnaire designed in our clinic, specifically for the present study. Data such as age at inclusion in the study, gender (sex), information about schooling, and medical history data were collected.

• "NSSI-AT" – "The non-suicidal self-injury assessment tool" (Whitlock, 2014)

• C-SSRS – "The Columbia Suicide Severity rating scale" (Posner, 2011)

• "BIS-BRIEF" – "Barratt Impulsiveness Scale" (Steinberg, 2013)

• "BDEFS-CA" – "Barkley Deficits in Executive Functioning Scale – Children and Adolescents" – version for parents (Barkley, 2012)

• "Cambridge Neuropsychological Test Automated Battery" ("CANTAB") neuro-cognitive test battery (Cambridge Cognition, 2017): objective, computerized tests designed to assess cognitive performance. These were officially purchased from the holders of the usage rights and provided in an optimized format for administration on an iPad tablet, including standardized instructions in Romanian.

- the spatial working memory test (SWM) (Cambridge Cognition, 2017): assesses spatial working memory and planning skills, requiring the memorization and manipulation of certain visual-spatial elements, as well as the use of an efficient strategy.

- the One-Touch Stockings of Cambridge (OTS) test (Cambridge Cognition, 2017): used to assess planning ability

- the Paired Association Learning (PAL) test (Cambridge Cognition, 2017): assesses visual memory, while also containing a learning component.

- the Multitasking test (MTT) (Cambridge Cognition, 2017) assesses inhibition and flexibility,

5. Study 1. Depressive disorders in children and adolescents: results from a clinical sample

5.1. Introduction

Recent studies indicate an increase in depressive and anxiety symptoms among adolescents, especially among girls, and the COVID-19 pandemic has exacerbated these

problems. The study aims to analyze the characteristics of adolescents with depressive disorders and self-harming behaviors, both suicidal and non-suicidal. The research also aims to increase awareness among medical professionals and highlight gender differences in the clinical profiles of these adolescents, to facilitate early identification of cases at risk (Andrei, 2025).

5.2. Materials and method

The retrospective, analytical and descriptive study was conducted on children and adolescents hospitalized with depressive disorders at the "Prof. Dr. Al. Obregia" Clinical Psychiatric Hospital in Bucharest between January 2020 and June 2024. The non-experimental design ensured the safety of the participants, and the diagnosis was based on the "ICD-10" criteria and structured psychiatric interviews. Socio-demographic and clinical data were analyzed using electronic medical records. Data processing was performed with Microsoft Office Excel 2007 and Microsoft Power BI 2024.

5.3. Results

In the study group, we had a total of n = 915 patients, of which 705 were girls (77.04%) and 210 (22.96%) were boys. The mean age of each group was similar - 15.38 years (SD ± 1.79) for girls and 15.56 (SD ± 1.78) in the boys' group, respectively, with the majority of patients (85.34%) belonging to the age range 14-17 years. In the study group, 273 (30%) patients (218 girls, 55 boys) were hospitalized specifically for suicidal ideation or intentional self-harming behaviors. Considering the types of depressive episodes, most patients - 49.62% (38.91% girls, 10.71% boys) were diagnosed with a severe depressive episode without psychotic symptoms.. During the analyzed period, a progressive increase in diagnosing depressive disorders was observed in the study group, after the COVID-19 Pandemic.

6. Study 2: Patterns of non-suicidal self-harming behaviors in a clinical population of adolescents

6.1. Introduction

As the number of patients resorting to non-suicidal self-harm behaviors (NSSI) has increased in recent years, there has been a constant need to develop appropriate assessment tools for these behaviors. The objectives of our study were to characterize a group of adolescent patients who presented with non-suicidal self-injurious behaviors in terms of the appearance, severity and purpose of these behaviors, as well as the patterns of self-harm practiced and the

impact on personal, school and social functioning, using the "NSSI-AT" test (Non-Suicidal Self-Injury Assessment Test) (Whitlock, 2014)

6.2. Material and method

The study analyzed data from 100 adolescents aged 13 to 17, admitted to the "Prof. Dr. Al. Obregia" Clinical Psychiatric Hospital in Bucharest between 2019 and 2023, diagnosed with depressive disorders (TD) and self-harming behaviors. To assess NSSI, the "NSSI-AT" test was used, adapted into Romanian with the approval of the authors. The analysis included the severity and dynamics of the diagnosis, the number and consistency of comorbidities, and the variables were subjected to a descriptive analysis.

6.3. Results

The sample of 100 adolescents hospitalized for neuropsychiatric disorders and self-injurious behaviors consisted of 80 girls and 20 boys, with a mean age of 14.9 years. Girls reported an earlier onset of self-injurious behaviors, with a mean age of 14.72 years, compared to 15.2 years in boys. All patients were diagnosed with depressive disorder (DD), and the most common comorbidity was anxiety disorder, found more often in girls (59%) than in boys (35%). Most adolescents presented disharmonious personality traits (85% of girls and 80% of boys), which highlights the complexity of psychological development during this period, when a diagnosis of personality disorder is not fully established. Regarding the forms of self-harm, the most frequently used methods were represented by cutting with sharp objects, both by girls and in the group of boys. The main function of self-harm behaviors was represented by the regulation of affective imbalance, in order to “feel something” – in the group of girls, and in the group of boys, the main purpose was “to manage anger”, classified as affective imbalance, high pressure situation. The motivation for initiating self-injurious behaviors was complex and multimodal, with all patients reporting multiple reasons. In girls, the most common reason was attempting to self-harm in moments of anger (89%), followed by seeking a sense of well-being (84%). In boys, anger was the main motivation (90%), highlighting a common pattern between the two groups. All patients had sought medical treatment for self-harm at least once before the current study. The severity of these behaviors was significant, with 91% of girls and 75% of boys reporting that they had hurt themselves more severely than they had anticipated. The impact of NSSI on adolescents’ daily lives was reflected as follows: self-harm was perceived as a real problem by a significant percentage of adolescents, with a higher prevalence among girls (91%)

than boys (75%). The study highlights both gender differences in perception and the areas most affected by this problem.

7. Study number 3: Analysis of executive functions in adolescents with suicidal or non-suicidal self-harming behavior

7.1 Introduction

The study presented in this subchapter starts from the hypothesis that adolescents with normal levels of intelligence and who manifest certain behavioral patterns of "self-harm" may present an impairment of executive functions (EF). To evaluate this hypothesis, the following objectives were established: subjective and objective assessment of executive functions in a clinical group of adolescents with suicidal or non-suicidal self-harm behavior compared to a control group composed of subjects without diagnosed mental disorders (healthy), as well as the evaluation of the existence of a correlation between self-harm behaviors, executive dysfunctions and impulsivity.

7.2. Material and method

The present study group consisted of the same 100 adolescent participants mentioned above. The control group consisted of 60 healthy adolescent subjects, aged 13-17 years, without a diagnosis of a mental disorder – at the time of the assessment or in the antecedents.

7.3. Results

• Modification of "BDEFS-CA" scores in patients with self-injurious behavior

In general, the scores obtained by the patients in the study group were considerably higher (where increased values encode deficit of function) than those obtained by the healthy volunteer subjects (control group). Exceptions to this rule were self-motivation (n.s., $p = 0.5923$ by Mann-Whitney U test) and the function of organization/problem solving (n.s., $p = 0.455$ by Mann-Whitney U test) in the case of male subjects. However, it should be taken into account that the number of male patients ($N = 20$) and the number of male control subjects ($N = 12$) was lower than the number of female patients and subjects ($N = 79/80$ with complete set of answers and, respectively, $N = 48$) which makes it more difficult to obtain significance in the male group. Thus, in the case of female subjects, patients with self-harm behavior obtained significantly higher scores ($p < 0.001$, Mann-Whitney U) in all tested functions of Self-motivation, emotional self-regulation, impulse control, time management and organization/problem solving, and male

patients obtained significantly higher scores compared to the control group only in the case of emotional self-regulation, impulse control, time management (each with $p < 0.001$ in the Mann Whitney U test).

Table 7.2. Summary of statistical analyses of the differences in scores between the study group and the control group

Variable	Gen	Norm Study Group	Norm Control Group	Test	Test statistics	p value
Self-motivation	F	Falsee	Falsee	Mann-Whitney U	2695	< 0.0001
	M	Falsee	Falsee	Mann-Whitney U	106	0.5923
Emotional self-regulation	F	Falsee	Falsee	Mann-Whitney U	3563.5	< 0.0001
	M	Falsee	Falsee	Mann-Whitney U	235.5	< 0.0001
Self restraint	F	Falsee	Falsee	Mann-Whitney U	3665	< 0.0001
	M	Falsee	Falsee	Mann-Whitney U	237	< 0.0001
Self-Time management	F	True	Falsee	Mann-Whitney U	3155.5	< 0.0001
	M	True	Falsee	Mann-Whitney U	239	< 0.0001
Self-organization/ Problem solving	F	Falsee	True	Mann-Whitney U	2598	0.0004
	M	Falsee	Falsee	Mann-Whitney U	139.5	0.455
Total score	F	Falsee	True	Mann-Whitney U	3692	< 0.0001
	M	Falsee	True	Mann-Whitney U	238	< 0.0001

• Changes in the "BIS-Brief" parameters in patients with self-injurious behavior

When comparing the self-rated items in the BIS-Brief questionnaire between patients with self-injurious behavior and control subjects, significant differences were obtained in all cases, with patients with self-injurious behavior presenting higher scores on items that evaluate behaviors usually interpreted as negative and significantly lower on items that evaluate positive behaviors. The largest difference observed was for items that assessed impulsivity (I tend to do things without thinking ahead, I act on the impulse of the moment, I say things that I do not think ahead).

• Changes in the CANTAB parameters in patients with self-injurious behavior

When the changes in the parameters measured in the CANTAB data set were evaluated, significant changes were found between the study group and the control group in most of the measured parameters. Among the most significant differences observed in the CANTAB battery of measurements, 19 belong to the group of measurements that refer to executive function, planning and working memory (assessed by the OTS, One Touch Stockings of Cambridge) exercise. Similarly, the lowest significance or the absence of statistical significance was observed with predilection in parameters that assessed spatial working memory (SWM) and multi-tasking (MTT). Interestingly, all parameters in the Paired Associates Learning (PAL) subset were significantly modified, but none of these changes were consistent enough to be represented in the top of the most significant changes. Among the PAL parameters, the most significantly modified was the total number of errors (on average 8.1 more for the study group, p-adj BH < 0.0001) which occupied only position 64 in the top of the most significant changes.

Table 7.5. CANTAB parameters most significantly changed in the study group compared to the control group

Parametre	Norm. study group	Norm. control	Test	P Value	P-adj (BH) Vaslur	diferență medie (studiu-control)
OTSMLC	false	false	Mann-Whitney	8.42E-21	1.14E-18	16645.84
OTSLCSD	false	false	Mann-Whitney	7.29E-20	4.92E-18	19432.9
OTSMDLC	false	false	Mann-Whitney	2.28E-19	7.70E-18	8425.078
OTSMLC5	false	false	Mann-Whitney	1.82E-19	7.70E-18	29146.06
OTSMDLC5	false	false	Mann-Whitney	9.97E-19	2.69E-17	25491.63
OTSMLFC	false	false	Mann-Whitney	1.21E-18	2.72E-17	12388.67
OTSMLF5	false	false	Mann-Whitney	1.88E-18	3.62E-17	22897.27
OTSLFCSD	false	false	Mann-Whitney	3.41E-18	5.76E-17	13598.04
OTSMDLFC	false	false	Mann-Whitney	1.24E-17	1.86E-16	6789.512
OTSMDLF5	false	false	Mann-Whitney	1.51E-17	1.91E-16	20972.1
OTSMLC4	false	false	Mann-Whitney	1.56E-17	1.91E-16	10052.62

OTSLC5SD	false	false	Mann-Whitney	2.89E-16	3.25E-15	19224.55
OTSMDLC4	false	adevărat	Mann-Whitney	1.14E-15	1.18E-14	7840.378
OTSMLF4	false	false	Mann-Whitney	1.75E-15	1.69E-14	7783.851
OTSLF5SD	false	false	Mann-Whitney	3.68E-15	3.31E-14	14367.07
OTSMLC6	false	false	Mann-Whitney	6.85E-15	5.78E-14	33626.12
OTSMDLC6	false	false	Mann-Whitney	2.27E-14	1.80E-13	29107.99
MTTLCSD	true	false	Mann-Whitney	3.67E-14	2.75E-13	112.1285
OTSMDLC1	false	false	Mann-Whitney	9.75E-14	6.58E-13	5839.762

- **Correlations between self-assessed parameters, assessed by parents, and objective parameters measured by "CANTAB"**

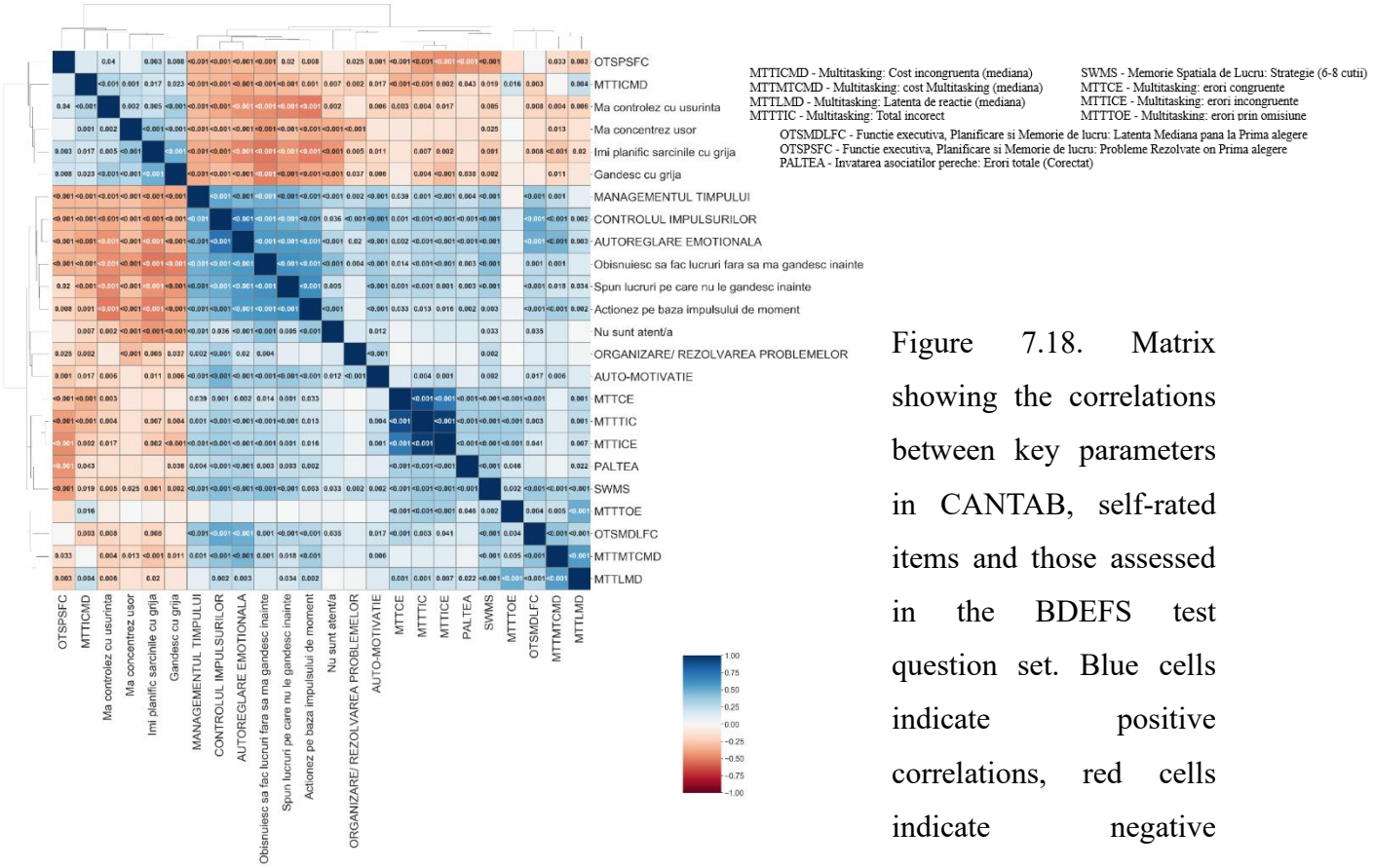

Figure 7.18. Matrix showing the correlations between key parameters in CANTAB, self-rated items and those assessed in the BDEFS test question set. Blue cells indicate positive correlations, red cells indicate negative correlations and the color intensity is given by the Pearson R coefficient value. For significant correlations, the values indicated in the cells represent the p-value of the correlation. The parameters were grouped using the unweighted pair group method with arithmetic mean (UPGMA) to identify groups of similar parameters

8. Conclusions and personal contributions

8.1. Conclusions

The results of this original research contribute to the expansion of existing knowledge in the specialized literature on the clinical aspects of depressive disorders in children and adolescents, as well as the self-harming behaviors, either suicidal or non-suicidal, that they may manifest. By applying the established research methodology and statistical analysis, the objectives proposed in the study were achieved. Thus, the typology of adolescents involved in self-harming behaviors was characterized and the impact of executive functioning on this pathology was analyzed. The present study analyzes the impairment of executive functions in adolescents with normal intelligence who present self-harming behavior, either suicidal or non-suicidal. The hypothesis was that executive dysfunctions can influence the severity of these behaviors and affect the overall functionality of these adolescents, independently of emotional factors. To validate the hypothesis, the study pursued two main objectives:

1. Analysis of the typology of adolescents with self-injurious behavior – identification of the clinical profile and gender differences, analysis of behavior in a clinical population and subjective assessment of executive functions compared to a healthy control group.
2. Assessment of executive functions – using neuro-cognitive tests, the study determines the level of concordance between subjective and objective assessments and investigates the correlations between self-harm, executive dysfunctions and impulsivity.

We consider that the research objectives were achieved as follows:

1. According to the results obtained in the first study, 30% of the participants were hospitalized for suicidal ideation or self-injurious behaviors, according to the specifics of the clinic and the risk associated with major depression. The higher rate of self-injurious behaviors among girls is confirmed by the specialized literature. The study observed a significant increase in cases of depression between 2020 and 2024, correlated with the impact of the COVID-19 pandemic on the mental health of children and adolescents.
2. The second study highlighted that girls exhibit self-harming behaviors earlier, with cutting with sharp objects being the most frequently used method of self-harm, motivated by emotional regulation in girls and anger management in boys. Self-harm was perceived as having a major negative impact on social relationships, self-esteem and daily activities.

3. By analyzing the results obtained from the “BDEFS-CA”, “BIS-Brief” tests, as well as the “CANTAB” tests, the link between executive dysfunctions and self-harming behaviors in adolescents was highlighted, pointing out the role of impulsivity and deficient inhibitory control in making risky decisions. The results obtained indicated significant differences between the study group and the control group, especially regarding executive functions, planning and working memory.

From a clinical perspective, the findings highlight multiple aspects of pediatric depression, providing relevant information for detailed assessments and underlining the importance of personalized therapeutic interventions. This study may constitute a solid basis for future research, facilitating the development of more complex designs, such as longitudinal studies, that could explore the causal relationships between risk factors and depressive symptoms, the effectiveness of tailored interventions, and the diverse clinical particularities of this pathology among more diverse groups.

Considering the impact on public health, this research contributes to expanding knowledge about depressive disorders in children and adolescents, documenting current trends, investigating underlying causes, and formulating hypotheses for future studies. The results obtained may be useful for clinicians and specialists in the field, providing a better understanding of the increasing prevalence of depression and suicide, as well as the need to refer affected patients for specialized assessments and tailored interventions.

The results support the integration of neurocognitive assessments into mental health screenings for adolescents at risk of self-harm and suicide, with important implications for understanding and preventing self-harm in adolescents. However, there are several limitations and unresolved issues in the current research on adolescent depressive disorders and self-harm, whether suicidal or non-suicidal, such as:

- etiological mechanisms: although there are genetic, neurobiological and psychosocial factors associated with depression and self-harm, the precise causal relationships between these factors and the onset of the disorder remain unclear; The present study may be a starting point in this direction, providing some explanations regarding the associated neurocognitive deficits, but further case-control research on larger groups of clinical populations and healthy subjects is needed

- reliable predictors for suicidal and non-suicidal behaviors: although impulsivity and executive dysfunctions are risk factors in the group analyzed in the present study, we believe that the relatively small number of subjects, especially in the control group, could influence these results; moreover, currently, there are not enough predictive models known that would allow for the precise identification of adolescents at highest risk
- although the instruments used, especially the CANTAB battery, have proven their relevance in the objective assessment of executive dysfunction in adolescents with self-harm and represent interactive and engaging assessment tools for this category of young people, there are also certain technical and economic disadvantages of this instrument, namely the need for iPad-type devices for assessment and the costs involved in this situation, as well as the costs of purchasing the tests from the CANTAB battery
- the impact of the digital environment and social media: the influence of social networks on depression and self-harming behaviors is intensely discussed, but the mechanisms by which they contribute to the worsening of symptoms are insufficiently studied; thus, an area of interest for future research may also be the impact of media factors on executive dysfunction in adolescents and their role in the development and maintenance of self-harming behaviors
- the effectiveness of personalized interventions: there are various treatments available (cognitive-behavioral therapy, pharmacotherapy, family interventions, group therapies), but there is not enough clarity on the most effective strategies for each individual profile, which take into account executive dysfunction in these cases; the current study highlights the need for interventions focused on improving executive functions, including cognitive training, therapy and behavioral coaching
- the role of neurodevelopment: adolescence is a period of significant neurological changes, and the way in which brain development influences vulnerability to depression and self-harm is not fully understood; supplementing the current study with neuroimaging data could contribute to understanding these mechanisms
- long-term impact: the effects of adolescent depression and self-harming behaviors on adult functioning, including mental and social health, are insufficiently studied, and future studies could contribute to the development of adapted assessment and therapeutic intervention models, starting from the present study

To address these issues, longitudinal studies that include larger sample sizes, more precise diagnostic methods, and innovative intervention strategies tailored to the needs of adolescents are needed, considering the extremely important aspect of stigmatization of mental health problems. Although awareness of mental health problems is increasing, stigma and barriers to access to treatment services remain a major challenge.

8.2. Personal Contributions

This last chapter of the thesis will synthesize the contributions made by this work to the field of study, highlighting the main research results, as detailed in the thesis, which are, as follows:

• the highlighting of clinical aspects of depressive disorders in children and adolescents, with a focus on specific differences between males and females

• highlighting a significant increase in cases of depressive disorders following the COVID-19 pandemic

• highlighting the characteristics of self-injurious behaviors in adolescents, using the NSSI-AT instrument

• using the "BDEFS-CA" instrument indicated that adolescents with self-injurious behaviors have significantly higher executive dysfunction scores;

• statistically significant differences between the study and control groups were more extensive in the case of female subjects, where all five executive functions measured by the BDEFS-CA are significantly affected ($p < 0.001$), compared to male subjects, in whom only three functions were significantly affected; we showed that executive deficits are more pronounced and statistically easier to detect in girls with self-injurious behavior than in boys, an aspect relevant for gender-differentiated clinical assessment.

• the use of the "BIS-Brief" Questionnaire indicated that adolescents with self-injurious behaviors obtained higher impulsivity scores, especially on items reflecting spontaneous actions and lack of self-control ($p < 0.0001$) and had lower scores on items assessing planning and attention control, confirming deficits in self-regulation;

• 30 "CANTAB" parameters ("Cambridge Neuropsychological Test Automated Battery") were identified that may be predictive factors for self-injurious behaviors, providing clinical screening value

• the strongest 30 CANTAB parameters that may be predictive factors for suicidal behaviors in patients with self-injurious behaviors were also identified

• multitasking performance (MTT) also demonstrated a significant correlation with suicidal behaviors.

• key cognitive indicators capable of predicting suicide attempts were identified, with sensitivity of up to 90.91% and specificity of 75% for certain OTS parameters

• the influence of intelligence quotient (IQ) on executive dysfunctions: certain CANTAB parameters correlated with IQ, requiring statistical adjustment to isolate real executive dysfunctions; the most significant adjusted predictors for IQ were OTS latency and problem-solving accuracy.

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