SEMMELWEIS EGYETEM

DOKTORI ISKOLA

Ph.D. értekezések

3203.

KENÉZLŐI ESZTER

Pszichiátria

című program

Programvezető: Dr. Réthelyi János, egyetemi tanár

Témavezető: Dr. Réthelyi János, egyetemi tanár

Emotion dysregulation and impulsivity as overlapping symptoms in adult Attention-Deficit/Hyperactivity Disorder and Borderline Personality Disorder: severity profiles and associations with childhood traumatization and personality functioning

PhD thesis

Eszter Kenézlői

Molecular Medicine Doctoral School
Semmelweis University

Supervisor: János Réthelyi, MD, Ph.D

Members of the review committe:

                                            Beáta Dávid Pethesné, Ph.D

                                            János Pilling, MD, Ph.D

                                            Gabriella Vizin, Ph.D

Members of the complex examination committee:

                                            József Kovács, MD, Ph.D

                                            János Csorba, MD, Ph.D

                                            Csaba Barta, MD, Ph.D

Opponents: Adrienne Stauder, MD, Ph.D

                                         József Halász, MD, Ph.D

Budapest, 2025

Content

List of abbreviations

aADHD - adult Attention Deficit Hyperactivity Disorder

ADHD - Attention Deficit Hyperactivity Disorder

BIS-11 - Barratt Impulsiveness Scale

BPD - Borderline Personality Disorder

CANTAB – Cambridge Neuropsychological Test Automated Battery

CGT - Cambridge Gambling Test

CNQ – Core Needs Questionnaire

CTQ – Childhood Trauma Questionnaire

DERS – Difficulties in Emotion Regulation Scale

DSM-5 - Diagnostic and Statistical Manual of Mental Disorders - fifth edition

ED - Emotion Dysregulation

HC - Healthy Control

IGT - Iowa Gambling Task

IMP - Impulsivity

LPFS – SR – Level of Personality Functioning Scale – Self Report form

N-ABST - Nature-Adventure Based Schema Therapy

OCD - Obsessive Compulsive Disorder

PID5 – Personality Inventory for DSM-5

PTSD – Posttraumatic Stress Disorder

RTISESPR – Reaction Time Simple Error Score - Premature Responses

RTIFESPR - Reaction Time Five Choice Error Score - Premature Responses

RVPTFA – Rapid Visual Processing – False Alarms

SCL-90 – Derogatis Symptom Checklist

SSTDEG - Stop Signal Task Direction Errors - Go Trials

SSTDES - Stop Signal Task Direction Errors - Stop Trials

SSTSSRT – Stop Signal Task Reaction Time

ST - Schema Therapy

SUD – Substance Use Disorder

1. Introduction

1.1 Emotion dysregulation (ED) and impulsivity (IMP) in the background of psychiatric conditions and their significance

High levels of emotional dysregulation and impulsivity are characteristic for several psychiatric conditions, e.g. borderline personality disorder (BPD), attention deficit hyperactivity disorder (ADHD), different types of mood and eating disorders, impulse-control disorders, non-suicidal self-harm, and suicide attempts. Moreover, elevated levels of ED and IMP are core symptoms and diagnostic criteria of BPD. The same implies for impulsive behaviour in ADHD, while emotion dysregulation is only recognized as an associated symptom of the latter condition according to the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition Text Revision (DSM-5-TR) (1). ED and IMP can therefore be considered as transdiagnostic, multidimensional constructs, reflecting on different factors of inhibitory control, moreover both are associated with childhood traumatic events (2, 3).

The aim of my PhD work was a cross-disorder assessment of the different domains ED of IMP (personality trait, impulsive action, choice impulsivity), as common overlapping symptom dimensions in adult attention deficit hyperactivity disorder (aADHD) and BPD. To describe the broad ED and IMP profile, we took into consideration the different factors of ED and IMP. We also aimed to assess the role of childhood traumatization in the etiological background of ED and IMP and the potential mediating role between traumas and personality functioning. We chose these disorders, i.e. aADHD and BPD, because of their great medical and societal burden and the high level of risk associated with these conditions. In our decision we also took into consideration the profile and resources of our departments, in order to be able to recruit enough participants for the study.

In the third study, which I briefly introduce in my thesis, we aimed to test the efficacy of nature-adventure based schema therapy (N-ABST), to gain more insight into the psychotherapeutic options of self-control problems.

1.2 adult Attention Deficit Hyperactivity Disorder (aADHD) and Borderline Personality Disorder (BPD) – associated but poorly understood

ADHD had been considered as a child and adolescent disorder, but research in the past two decades has shown that it persists into adulthood in 30-70 % of the cases and the prevalence is much larger than it was thought before (4-6). Nowadays ADHD is one of the most common psychiatric disorders, with the prevalence rates ranging from 5 to 10.5 % in childhood (7-9), and 2.5 - 4.9% in adulthood (10-12). ADHD represents a great burden not only for the patient, but also for the whole family. Children with ADHD have difficulties in the school and home environment as well, cannot meet the requirements expected, get into trouble because of their impulsivity, having frequent conflicts with peers and family members. The persistent nature of the condition can have serious long-term consequences for the individuals. In particular, adults with ADHD are more likely than the general population to suffer from educational underachievement, occupational and social relationship difficulties, lower income, and engage in risky behaviours (e.g. reckless driving, sexually transmitted infections, substance abuse, delinquency), and to suffer from comorbid mental health problems (including anxiety, depression, emotional lability, and sleep problems) (10).

BPD is also a chronic disorder with high health care and social service use and present in approximately 2% of the general population (13) whereas the rates of BPD are 12 % in outpatient and 22 % among inpatient psychiatric populations (14). BPD patients have the highest rates of lifetime suicide attempts (75%) and completed suicide (10%) among patients suffering from mental disorders (15). In addition, BPD is highly comorbid with a number of major psychiatric disorders and other personality disorders (16, 17). It is interesting to note that the prevalence of BPD does not show gender difference in the general population, however, among patients seeking help in the Hungarian health care system, 75 % are women. The core symptoms of BPD include emotional disturbance (affective instability, intense anger), suicidal or other self-damaging behaviours (such as substance abuse, reckless driving, unsafe sex), disturbed cognition (identity disturbance, transient paranoid ideation or dissociative symptoms) and interpersonal problems (intense unstable relationships, fear of abandonment) (18). Large longitudinal studies have shown that many BPD patients experience improvement and even resolution of borderline

features over time, although they do not fully recover, and a subset of patients experience severe long-term disability (19). Although pharmacological treatments for BPD are limited in their effectiveness, polypharmacy is characteristic for BPD patients (20). The high economic cost of borderline personality disorder is related to the widespread use of more intensive treatments, such as emergency department visits and psychiatric hospital services as well as to high criminal justice costs and productivity losses (21).

In clinical samples of BPD patients, the prevalence of adult ADHD is higher than in the general population, ranging from 16% to 38% (22, 23). These data support our hypothesis, that ADHD and BPD have a partially shared aetiology, e.g. through emotion dysregulation and impulsivity. Lately "equifinality" have been proposed to explain this higher-than-chance association. Importantly, neuroimaging work has made it clear that impulsive behavior is equifinal, where different cognitive mechanisms can result in similar observable behaviour (24). However shared genetic and environmental vulnerability (25) and neurobiological dysfunction (26) could also explain these similarities.

In summary, ADHD and BPD are prevalent, chronic psychiatric disorders with high health-care costs and overlapping symptom characteristics, significant inhibitory control difficulties resulting in ED and IMP. Therefore, it would be essential to better understand the ED and IMP profile and to find effective psychotherapeutic treatment options for these core features of both ADHD and BPD, to alleviate the personal and socioeconomic burden of these syndromes.

1.3 Overlapping symptoms: emotion dysregulation (ED) and impulsivity (IMP) profile in aADHD and BPD

The Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM-5, 2013) (18). ADHD criteria of inattention, hyperactivity, and impulsivity have been criticized as being insufficient in describing the full nature of this disorder in adults. ED has been proposed to be an additional significant feature of ADHD in adulthood (27). Despite the clinical evidence, to date, only four studies have directly compared ED in ADHD and BPD. Witt et al. (2014) compared the two patient groups with control group and significantly higher levels of ED was found in the BPD group, compared with the ADHD group (28). Philipsen et al. (2009) compared aADHD, BPD, and healthy controls

using the Borderline Symptom List. Significantly higher scores were reported on the Emotion Regulation subscale for BPD than for ADHD participants (29). In both studies, ED was assessed a) with a measure developed to capture either ADHD or BPD symptomatology, and b) as a single construct, neglecting different factors of ED. Cavelti et al. (2019) has carried out a study in which the Emotion Regulation Skills Questionnaire (30) was used to assess perceived emotional regulation skills in the past week. Adults with ADHD and BPD reported comparable difficulties in ED, in encouraging oneself to attend inner aversive experiences, without engaging in impulsive behaviour, but no attention was taken to detect overlapping comorbidity in the two patient groups (27). According to the study of Rüfenacht et al. (2019) ADHD patients, although having higher ED than subjects of general population, had better control over their emotions with higher use of adaptive cognitive strategies and lesser use of non-adaptive strategies than BPD patients (31). Research on impulsivity in ADHD and BPD is ongoing, and there are still questions about whether ED and IMP manifests differently in these two conditions. It is important to determine if impulsivity in BPD is distinct from impulsivity in ADHD or if it is a feature of a comorbid, underlying ADHD. Studies and analyses are needed to provide a clearer understanding of these relationships (32).

There are several definitions of impulsivity, but the most widely used entails the following features: "A predisposition to rapid and unplanned reactions – triggered by internal and external stimuli, regardless of their negative consequences for the individual or others", or basically "acting without thinking". IMP is considered both a personality traits and a neurocognitive dysfunction. Computational modelling and empirical evidence has demonstrated that impulsivity is closely linked to value-free random exploration, the tendency to forego high valued and known outcomes for unknown choice options (33). Previous studies indicate that there is no global impulsivity factor, rather, impulsivity is a multidimensional construct, best captured by at least three different factors (34). The impulsivity profile consists of 1) impulsive personality traits reflecting self-reported attributions of self-regulatory capacity; 2) impulsive actions: the inability of withholding premature actions (waiting impulsivity) or stopping ongoing actions (stopping impulsivity); and 3) impulsive choice pattern: the presence of delay aversion in decision making. Impulsivity related personality traits are measured by self-report questionnaires. Impulsive actions (response inhibition) can be captured by

neuropsychological tests, such as the Go/No-Go task or the Stop signal task. There are paradigms designed for measuring delay aversion itself, e.g. delay discounting tasks, and decision making paradigms, like the Iowa Gambling Task (IGT) and the Cambridge Gambling Test (CGT) (35).

Several lines of evidence demonstrate altered self-regulatory profiles in aADHD and BPD. Measured by the Barratt Impulsiveness Scale (BIS-11), BPD patients scored significantly higher than healthy control (HC) subjects, while the aADHD group scored significantly higher than the BPD and HC groups (36). In terms of waiting and stopping impulsivity most studies indicated intact levels in BPD individuals, however increased impulsive choice behaviour was observed (37). According to a recent meta-analysis of Mcclure (2016), BPD patients showed worse performance in some cognitive domains, but no specific cognitive functions were detected in which BPD patients would fail consistently. These heterogeneous results could be the consequence of the high rate of comorbidities is BPD, among these ADHD is often neglected, although it could also lead to atypical impulsivity test results (38). Behavioural impulsivity was clearly the most severe among patients with aADHD as a main diagnosis or as a comorbidity, and less severe among BPD patients without ADHD according to the study of Lampe et al. (26).

The next factor, impulsive choice refers to a tendency to prefer smaller, immediate rewards over larger, delayed rewards. In the context of BPD, individuals may be more prone to make decisions that provide immediate gratification, even if they are associated with negative consequences in the long term. Delay aversion was found to be affected both in ADHD and BPD. Behavioural paradigms can be categorized as emotionally neutral or emotionally involving decisional/motivational impulse control measures. Current evidence suggests that "cold", i.e., emotionally neutral impulse control is less affected in BPD than "hot" impulse control, i.e., components involving affective and/or motivational aspects (39-41).

1.4 Emotion dysregulation and impulsivity as mediators between childhood traumatization and personality functioning

Several studies indicate that childhood adversities are associated with a wide range of psychiatric pathologies (42), i.e., mood disorders (43-45), anxiety disorders (46-48), substance use disorder (49, 50), and psychosis (51). Non-suicidal self-harm (52), suicidal ideation, and suicidal behaviour have also been linked with childhood trauma in several populations (53, 54). There is an increasing need for the retrospective detection of early adverse events in order to recognize and prevent the long-term consequences of childhood adversity and maltreatment. It has been suggested that the extreme stress caused by adverse circumstances can affect early brain development, as well as the development of neurohormonal and immune systems (55, 56). In addition to the general effects of stress, traumas associated with threats (e.g., physical and sexual abuse) or deprivation (emotional and physical neglect) have profound effects on cognitive and emotional development and subsequent psychopathology (57).

There are only a few studies reflecting on the role of childhood traumatization in the background of emotion dysregulation and impulsivity in the context of aADHD and BPD. Krause-Utz et al (2019) aimed to investigate associations between childhood trauma severity, emotion regulation difficulties, and impulsivity in women with BPD compared to healthy and clinical controls. They have found, that childhood traumas, particularly emotional maltreatment, was positively associated with ED and IMP across all groups. In the context of current conceptualizations of BPD and previous research, findings suggest, that problems with emotion regulation may be related to a history of childhood maltreatment, which may in turn enhance impulsivity (2). According to the results of Lepouriel at al. (2019) trait impulsivity measured by BIS-10 was significantly associated to traumatic childhood events (Childhood Trauma Questionnaire, CTQ total score) in the healthy control group, but not in the BPD and ADHD and BPD group (36).

Clinicians view global severity of personality dysfunction as particularly useful for estimating long-term prognosis: the measure indicates treatment outcome, readiness for treatment, risk of dropout, risk of self-harm and violence, preventive strategies and clinical management - regardless of primary diagnoses. The DSM-5 Level of Personality Functioning Scale – Self Report form (LPFS-SR) (58) gives a comparable framework to

assess personality functioning, a very important tool in assessing the severity of psychopathology, and constitute the foundation - together with the Personality Inventory for DSM-5 (PID-5) (59, 60)- of the Alternative Model for Personality Disorders (AMPD) in the Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-5) Section III (18).

To our best knowledge no previous study measured the potential mediating role of ED and IMP between childhood traumas and the level of personality functioning in a trans-diagnostic setting, involving aADHD, BPD patients and HC subjects.

1.5   Measuring childhood traumatization

Measuring early traumatization in clinical evaluation is crucial, while it has a great impact on the course and symptom severity of psychiatric disorders and treatment response (61, 62). Yet, there are challenges in the retrospective assessment of childhood adversities in adulthood: including issues with memory distortion caused by the long time lag, and the tendency of normalization of maltreatment: it takes time to realize, that "things shouldn't have happened in the way they happened in my childhood". Negative emotions, like shame can also result in difficulties in detection of childhood traumatization. Methods to measure early traumas include self-rated questionnaires and expert-rated interviews. Self-rated questionnaires like the Childhood Trauma Questionnaire Short Form (CTQ-SF) offer advantages such as being economical, easily administered, and assuring anonymity for respondents (63, 64). On the other hand, expert-rated interviews provide a more detailed description of traumatic experiences. The CTQ-SF is a widely used instrument that measures childhood exposure to traumatic experiences in five dimensions: Emotional Abuse, Physical Abuse, Sexual Abuse, Emotional Neglect, and Physical Neglect. It has been shown to have good reliability and validity in clinical and community samples (65, 66). The questionnaire focuses on the frequency of experiences and events rather than specific details to help recognize abuse and neglect. There has been a lack of non-invasive, easy to administer tools with good reliability and validity for detecting childhood adverse events in Hungarian (67). Therefore, CTQ was selected for translation and validation and to be used in our study due to its advantages discussed above.

1.6 Therapeutic options for improving personality functioning

In our complex research we planned not only to detect risk factors (e.g. traumas) related to self-regulation problems, which is important in prevention when investigating groups at risk. We also planned to compare the efficacy of an innovative experience based technique supplemented psychotherapy form with traditional schema therapy (ST), focusing on personality functioning and self-regulation, in order to develop targeted prevention strategies for risk behaviours, and to alleviate the personal and socioeconomic burden of these conditions.

Schema Therapy was developed by J.E. Young to treat personality disorders and other chronic psychiatric disorders. A central element of ST is, that early adverse experiences (e.g.: childhood abuse, emotional neglect, lack of secure attachment) and the frustration of basic childhood needs (safety and attachment, autonomy, freedom to express feelings, spontaneity, boundaries) lead to the development of maladaptive schemas about one's self, one's relationships to others and the world. These schemas are dysfunctional emotional and cognitive patterns that were established in childhood and are reemerging throughout life. When a maladaptive schema gets activated, the associated difficult emotions arise with it (68). The new trend in ST involves experience based techniques in order to provide patients with new experience of connection with the self, and with others resulting in the development of more healthy strategies, and questioning the original maladaptive patterns.

Adventure Therapy (AT) is an action and experience-based therapeutic approach in which the therapeutic effect is enhanced through physical actions and experiences in comparison with a verbal method. Adventure is a concrete, action-based, experiential medium of therapy. Specific activities are chosen to achieve specific therapeutic goals. It offers primarily a range of social experiences that result in a high degree of personal involvement (physical, emotional, and cognitive) due to the challenging group exercises they take place mainly outdoors. In addition, not only the personal difficulties, but also the resources of the personality and the group also emerge and are reflected throuhout the therapeutic process. Evidence suggests that nature, the traditional living conditions of individuals is considered an important factor in the development and maintenance of mental well being. Nature - adventure therapies provide a very different context and way

of experiencing 'self-awareness' and 'self-experience'. The natural environment and the novel experience based activities can facilitate change and support long term healing and growth (69).

Our efficacy study fits in this trend of ST, by combining the advantage of experience based activities and the positive effects of conscious presence in natural environment on various mental and psychological disorders by integrating Nature-Adventure Therapy (N-AT) into classic Schema Therapy (ST) and creating an innovative program, the so called Nature-Adventure Based Schema Therapy (N-ABST).

In the pilot study of Bíró and Unoka in 2020, ST proved to be efficient (strong effect on Identity, Cohen d=0,8 and moderate effect on Self-Direction Cohen d= 0,46) in the "self" domain, measured by the LPFS-SR, but no significant differences were found at the "social" domain (Empathy and Intimacy) between scores before and after 4-week ST. Our aim was to integrate N-AT in the classic ST process in order to improve the "social" domain of personality. As an experience based group method, which involves participants not only on the cognitive level, but also physically and emotionally N-AT is considered to be efficient in improving skills needed in social interactions (e.g. to show empathy for others, to tolerate different point of views, to identify the consequences of one's behavior) (70).

While the results of this third study have not been published so far, the study design will be presented in the framework of this doctoral thesis.

2. Studies

The first study aimed the validation of the Hungarian version of the Childhood Trauma Questionnaire Short Form (H-CTQ-SF).

The second study had three objectives: First, to compare factors of ED and IMP between aADHD, BPD and HC groups to explore divergent inhibitory profiles. Second, to assess the association of childhood trauma and self-regulatory impairments at trait and behavioural levels. Third, to test the potential role of ED and IMP between childhood traumas and personality functioning.

The third study aimed to test the efficacy of Schema Therapy (ST) and Nature - Adventure Based Schema Therapy (N-ABST) for improving personality functioning and assessing the potential mediator effect of emotion regulation.

All studies carried out received ethical board approval from the Hungarian Health Science Council (Egészségügyi Tudományos Tanács, ETT) and the Semmelweis University Institutional Research Ethics Committee prior to data collection: IF-113908/2015 and IF-621-2/2017, and approved modifications: 25329-5/2018/EÜIG and 926-5/2018/EÜIG.

2.1   First study

Validation of the Hungarian version of the Childhood Trauma Questionnaire – Short
Form (H – CTQ – SF)

2.1.1   Objectives

To examine the psychometric properties of the Hungarian version of the
Childhood Trauma Questionnaire Short Form (H-CTQ-SF) and to investigate the
differences between patients diagnosed with aADHD and BPD in terms of early
traumatization.

2.1.2   Methods

Participants

Altogether 765 (mean age=32.8 years, 67.7% women) patients and control
subjects were enrolled. Patients and control subjects were recruited in the capital city of
Hungary at Semmelweis University, Department of Psychiatry and Psychotherapy, and a
mid-sized town at the University of Pécs, Department of Psychiatry and Psychotherapy,
to expand the sample with subjects from rural areas. Both sites provided clinical and non-
clinical samples, and were granted ethical approval by relevant research ethics
committees. All participants provided written informed consent. A community sample of
358 subjects without any psychiatric history was recruited in Pécs, in order to test the
general feasibility of the H-CTQ-SF and to make some minor changes to improve the
translation. This community sample was complemented by 171 psychiatric inpatients
recruited in Pécs, who were diagnosed according to DSM-5 criteria. The rates of primary
diagnoses in this psychiatric inpatient group were the following: 85.4% mood disorders,
21.2% personality disorders, 15.8 % substance use disorders, and 11.7% other. The
psychiatric patients enrolled in Budapest were diagnosed with either aADHD (n = 78), or
BPD (n = 60) as a main diagnosis. In the aADHD group 53.8%, in the BPD group 93.5%
of the subsample had at least one comorbid diagnosis.

Exclusion criteria were the same at both sites: psychosis, neurocognitive or
developmental impairment, mental retardation or insufficiency of reading and writing,
limiting the abilities of informed consent and assent. Altogether 765 participants were

included in the study. **Table 1**. shows the demographic characteristics of the total sample and each study group.

Table 1. *Sociodemographic characteristics of the sample, the aADHD, BPD, screened control, psychiatric inpatient groups, and community sample. Subjects in the aADHD, the BPD and the screened control group were enrolled at the Budapest site. Subjects in the psychiatric inpatient group and the community sample were recruited in Pécs (67).*

	Total	aADHD group	BPD group	Screened control group	Psychiatric inpatient group	Community sample
	n = 765	n = 78	n = 60	n = 98	n = 171	n = 358
Mean age	32.83	26.5	26.2	26.39	37.73	35.20
(SD)	(11.65)	(4.59)	(4.63)	(4.60)	(13.94)	(12.17)
Min	18	18	18	18	18	18
Max	75	35	35	35	75	70
Gender n (%)						
Male	243 (31.8)	46 (59.0)	13 (21.7)	42 (42.9)	60 (35.1)	82 (22.9)
Female	518 (67.7)	32 (41.0)	46 (76.7)	56 (57.1)	110 (64.3)	274 (76.5)
Non binary	2 (0.3)	0 (0)	1 (1.7)	0 (0)	1 (0.6)	0 (0)
Missing	2 (0.3)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.6)
Education n (%)						
Primary school (8 years)	33 (4.3)	1(1.3)	5 (8.3)	1 (1)	22 (12.9)	4 (1.1)
Secondary school	45 (5.9)	1 (1.3)	3 (5.0)	0 (0)	31 (18.1)	10 (2.8)
(8+2 years)	299 (39.1)	40 (51.3)	34 (56.7)	48 (49.0)	46 (26.9)	131 (36.6)
Graduation (8+4 years)	359 (46.9)	36 (46.2)	18 (30.0)	49 (50.0)	43 (25.1)	213 (59.5)
Finished BSc/MSc/PhD	29 (3.8)	0 (0)	0 (0)	0 (0)	29 (17.0)	0 (0)

Psychiatric assessment

A board-certified psychiatrist or clinical psychologist interviewed patients of the BPD and aADHD groups at the Budapest site using MINI 5.0 (71, 72) and SCID-5-PD (73) interviews to validate the clinical diagnosis and detect comorbid psychiatric disorders. Comorbid BPD cases detected by the SCID-5-PD were excluded from the aADHD group, while ADHD symptoms detected by the MINI 5.0 resulted in exclusion

from the BPD group to ensure the exclusivity of the two main diagnoses, in order to detect the trauma profile in the aADHD group not attributable to comorbid BPD. BPD patients who had no aADHD diagnosis in the past, but met 3 or more attention deficit/hyperactivity symptoms according to the DSM-5 criteria of ADHD, were excluded as well. The screened healthy control group recruited at this site consisted of 98 healthy subjects without any psychiatric history, not using drugs regularly, and screened by Derogatis Symptom Scale (SCL-90) (74) and Conners' Adult ADHD Rating Scales (CAARS, 66-item version) (75). To meet inclusion criteria, their Global Severity Index score had to be below 70 (T-score < 70), furthermore, two of the Inattention, Hyperactivity and Impulsivity CAARS domains needed to be below 70.

The Personality Inventory for DSM-5 (PID-5) by APA, 2013 (59, 60) was administered in each group. This questionnaire was developed for the detailed measurement of personality traits in the background of personality disorders following the dimensional approach of personality disorders. Twenty-five personality traits were assessed, creating 5 higher-order domains: negative affectivity, detachment, disinhibition, antagonism, and psychoticism.

The CTQ short form is suitable for assessing five types of abuse and neglect in childhood and adolescence. The questionnaire takes 5-10 minutes to complete and can be used with clinical and normative subjects, both individually and in groups. It consists of 28 items on five scales: emotional abuse (EA), physical abuse (PA), sexual abuse (SA), emotional neglect (EN), and physical neglect (PN). In the original English version, each scale consists of five items. Three additional items are used to measure the tendency of minimizing or denying abuse, these three items form the validity subscale. These items can be used effectively to detect the denial or underestimation of trauma, and thus reduce this type of bias. The subject evaluates each item on a Likert scale from 1 to 5 based on the frequency of each life event that occurred before the age of 18 years (never=1, rarely=2, sometimes=3, often=4, very often=5). The questionnaire also contains reversed items. Therefore, scores on each scale range between 5 and 25.

The items of the validity scale are also evaluated on a Likert scale from 1 to 5, but the scores are evaluated differently: the scale values are converted to binary values (0 and 1). An item score of 1 to 4 is converted to 0, while the value of 5 is re-scored as 1. Therefore, the three items in the validity scale can add up to 0, 1, 2, and 3 points. In the

case of a score of 0, the questionnaire results and the completion can be considered valid, while a score of 1 to 3 indicates the likelihood of denial or underestimation and underreporting of maltreatment (false negatives).

This indicator is particularly relevant when the test profile consists of very low trauma scores in most maltreatment areas, a profile suggesting a tendency to pervasively minimize or deny maltreatment. Under these circumstances, the profile of low trauma scores should be interpreted with caution, and other sources of information should be used to verify the absence of abuse and neglect.

The Hungarian version of the instrument was created using the "reverse" method. The original English questionnaire was translated into Hungarian, which was translated to English again by a bilingual professional blind to the original version of the CTQ-SF. The latter translation was compared to the original by two independent researchers not involved in this study and by a research fellow at the Institute of Anglistics, Faculty of Humanities, University of Pécs. Relevant semantic issues were considered and corrected if necessary. Item 10 contains a double negative that is not a common grammatical form in Hungarian. Testing the H-CTQ-SF in a community sample proved that the double negative in item 10 was indeed difficult to understand and compromised the applicability of this item. To rescue item 10, it was re-worded without the double negative (67).

Data analysis

SPSS version 27 was used for all statistical analyses, except for confirmatory factor analysis. Internal consistency was calculated using Cronbach's alpha (76). Principal component analysis was carried out to explore the factor structure of H-CTQ-SF. Confirmatory factor analysis (CFA) was performed by using the JASP 0.16.1.0 program in order to examine the Hungarian version of the CTQ-SF and its fit with the original five-factor model (65, 77-83). Since the chi-square test is susceptible to sample size, even a small difference will result in a significant difference as the sample size increases, this study used four fitting indicators: the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). The criteria used to evaluate model fit were: CFI and TLI $\geq$ .95, whereas RMSEA and SRMR $\leq$ .05. An advantage of RMSEA is that a confidence interval can be calculated, which provides more information regarding

model fit than a point estimate. The upper bound of this confidence interval should be ≤ .10 for an acceptable model fit (84). Discriminative validity was tested by comparing the clinical and non-clinical samples using Mann–Whitney U test, and comparing the BPD, aADHD and screened control groups using ANOVA analyses and Bonferroni post hoc tests. Correlation analyses were carried out between H-CTQ-SF subscales, and separately, between H-CTQ-SF subscales and PID-5 domain scores. The domains of the PID-5 used for correlation analyses were chosen based on clinical relevance, and recent studies (85-87).

2.1.3   Results

Minimization and denial of traumatization

First, we analysed the H-CTQ-SF validity scale. The role of the 3 validity items is to identify responses minimizing or denying abuse and neglect, thus ensuring validity of the analysed data. Of the 765 completed questionnaires 599 were valid, representing 78.3% of the total sample. The number of valid questionnaires was not statistically different in the clinical and non-clinical subgroups (χ^2 (df = 1, n = 765) = 3.228, p = .072, φ = .065). In the clinical sample 252 out of 309 (81.6%), while in the non-clinical sample, 347 out of 456 (76.1%) were considered to be valid. The proportion of the valid questionnaires was highest in the BPD group (96%), which can be due to the fact, that most of the BPD patients were recruited from an inpatient, psychotherapeutic ward, while other patients were recruited at outpatient units, not having a psychotherapeutic profile. In other terms, BPD patients might have been more reflective of their traumas. Only valid questionnaires were used for further analyses (67).

Reliability and internal consistency

Internal consistency coefficients for the original CTQ scales, described by Bernstein et al. (65) were computed as Cronbach's alpha (76) values (**Table 2**). Reliability coefficients of the H-CTQ-SF scales in the total sample ranged between .65-.95 both in the clinical and non-clinical sample, indicating an adequate internal consistency of the H-CTQ-SF (67).

Table 2. *Cronbach's alpha values of the 5 scales of H-CTQ-SF measured in the total valid, clinical and non-clinical sample (67).*

Scale – Cronbach's α	Total n = 599	Clinical sample n = 252	Non-clinical sample n = 347
Emotional abuse (EA)	.880	.870	.874
Physical abuse (PA)	.873	.863	.882
Sexual abuse (SA)	.934	.926	.946
Emotional neglect (EN)	.876	.842	.886
Physical neglect (PN)	.651	.636	.611

Principal component analysis

Principal component analysis (PCA) was carried out on the total valid sample of 599 cases to explore the factor structure of the Hungarian version of the CTQ-SF and compare it with the original factor structure described by Bernstein et al. (65). Pair-wise exclusion of cases was used to handle missing values. Since the subscales were known from previous studies to be inter-correlated (88), oblimin rotation was applied. We used Kaiser's eigenvalues >1; Cattell's scree test, and parallel analysis using both mean and 95th percentile eigenvalues (89, 90) to determine the number of factors to retain. The five-factor solution accounted for 68% of the variance. Only two cross-loadings were observed in PCA, items 2 and 4 loaded onto the EN, instead of the PN scale (**Table 3**) (67).

Table 3. *Results of the principal component analysis (PCA) using the five-factor solution (R² = .68) with oblimin rotation and Kaiser normalization. EN: emotional neglect, SA: sexual abuse, PA: physical abuse, PN: physical neglect, EA: emotional abuse. Loadings below 0.4 are not indicated. * Reversed items (67).*

When I was growing up…	EN	SA	PA	PN	EA
13* People in my family looked out for each other.	−0.785				
28* My family was a source of strength and support.	−0.784				
19* People in my family felt close to each other.	−0.778				
5* There was someone in my family who helped me feel that I was important or special.	−0.726				
7* I felt loved.	−0.724				
2* I knew that there was someone to take care of me and protect me.	−0.618				
4 My parents were too drunk or high to take care of the family.	0.432				
20 Someone tried to touch me in a sexual way, or tried to make me touch him/her.		0.963			
24 Someone molested me.		0.941			
27 I believe that I was sexually abused.		0.939			
23 Someone tried to make me do sexual things or watch sexual things.		0.912			
21 Someone threatened to hurt me or tell lies about me unless I did something sexual with them.		0.725			
9 I got hit so hard by someone in my family that I had to see a doctor or go to the hospital.			0.866		
17 I got hit or beaten so badly that it was noticed by someone like a teacher, neighbour, or doctor.			0.835		
11 People in my family hit me so hard that it left me with bruises or marks.			0.811		
12 I was punished with a belt, a board, a cord, or some other hard object.			0.699		
15 I believe that I was physically abused.			0.625		
6 I had to wear dirty clothes.				−0.822	
1 I didn't have enough to eat.				−0.666	
26* There was someone to take me to the doctor if I needed it.				0.611	
3 People in my family called me things like "stupid," "lazy," or "ugly".					0.729
14 People in my family said hurtful or insulting things to me.					0.700
25 I believe I was emotionally abused.					0.598
18 I felt that someone in my family hated me.					0.553
8 I thought that my parents wished I had never been born.					0.422

Confirmatory factor analysis

A confirmatory factor analysis was carried out to assess the structural validity of the H-CTQ-SF in the pooled clinical (aADHD, BPD, psychiatric inpatient group) and non-clinical (screened healthy control group and population sample) groups. The tested five-factor model was based on the factor structure described by Bernstein et al. (46). Although the original model reached a moderate fit (**Table 4**), 13 pairs of error variances, that made substantive sense, and loaded on the same scales were freed to covary: items 24 and 27 both refer to sexual abuse, items 13 and 19 refer to "people in my family", items 3 and 14 are about experiencing hurtful things, items 8 and 18 express hate, items 5 and 7 entail love and importance. Items 9, 11, 12 and 17 refer to severe corporal punishment, thus they were freed pairwise. Items 21 and 23 both refer to the coercion of sexual activities. Item 2 loaded on the EN factor instead of the PN factor, thus it was

removed from the items of PN. The goodness-of-fit statistics of the five-factor model with covariation residuals and after removing item 2 proved an excellent model fit (χ^2 = 648.653, df = 229, p < .001, CFI = .956, TLI = .947 RMSEA = .055, RMSEA CI upper bound = .06, and SRMR =.044). The explained variances of the items for this model ranged from .213 (item 4 on the PN scale) to .950 (item 20 on the SA scale) (67).

Table 4. *Model fit indices of the confirmatory factor analysis models of the H-CTS-SF. CFI = comparative fit index, TLI = Tucker-Lewis index, RMSEA=root mean square error of approximation, CI=confidence interval; SRMR=standardized root mean square residual (67).*

	χ^2 (df)	CFI	TLI	RMSEA [90% CI]	SRMR
Original 5 factor model	1312.773 (265)	.896	.883	.081[.077, .860]	.055
5 factor model with reasonable covariation residuals	767.938 (252)	.949	.939	.058 [.054, .063]	.050
5 factor model without item 2	648.653 (229)	.956	.947	.055 [.050, .060]	.044

Correlation analyses

Next, we investigated the intercorrelation of the CTQ subscales in the total valid sample (n = 599). The five scales were in moderate to strong correlation with each other, indicating the co-occurrence of the different traumas, which is consistent with previous studies (**Table 5**).

Table 5. *Spearman correlation coefficients between the CTQ subscales. EA: emotional abuse, PA: physical abuse, SA: sexual abuse, EN: emotional neglect, PN: physical neglect (67). *** p < .001*

	EA	PA	SA	EN	PN
EA		.581***	.347***	.674***	.581***
PA			.305***	.460***	.430***
SA				.252***	.294***
EN					.683***

We also explored the correlation of H-CTQ-SF subscales with *a priori* selected PID-5 subscales, including emotional lability, anxiousness, separation insecurity, withdrawal, intimacy avoidance, anhedonia, depressivity, suspiciousness, hostility, as these were associated with early trauma in previous studies. The EA, the SA the EN and PN subscales of the H-CTQ-SF showed significant, low to moderate positive correlations in the aADHD, BPD and screened healthy control groups (n = 236), with each analysed subscale of the DSM-5 personality inventory indicating a good convergent validity (**Table 6**). Values of the PA subscale, albeit positively, were only correlated with the PID-5 anxiousness, separation insecurity, suspiciousness subscales (67).

Table 6. *Spearman correlation coefficients between H-CTQ-SF and selected PID-5 subscales in the aADHD, BPD and screened control groups (n = 236). EA: emotional abuse, PA: physical abuse, SA: sexual abuse, EN: emotional neglect, PN: physical neglect (67). * p< 0.05 ** p<0.01 *** p < .001*

	Negative affectivity				Detachment			Other traits	
	Emotional lability	Anxiousness	Separation insecurity	Withdrawal	Intimacy avoidance	Anhedonia	Depressivity	Suspiciousness	Hostility
EA	.295***	.283***	.275***	.222**	.255***	.235**	.293***	.374***	.260***
PA	.084	.152*	.157*	.130	.093	.105	.128	.246**	.112
SA	.221**	.234**	.212**	.218**	.195**	.230**	.259***	.238**	.143*
EN	.232**	.242**	.222**	.227**	.356***	.370***	.341***	.245**	.207**
PN	.173*	.139	.182*	.256***	.228**	.248***	.259***	.287***	.159*

<u>Discriminative validity of the H-CTQ-SF</u>

Using Mann–Whitney U-test for pairwise comparisons, the clinical and non-clinical samples demonstrated significant differences in each CTQ subscale (**Figure 1**).
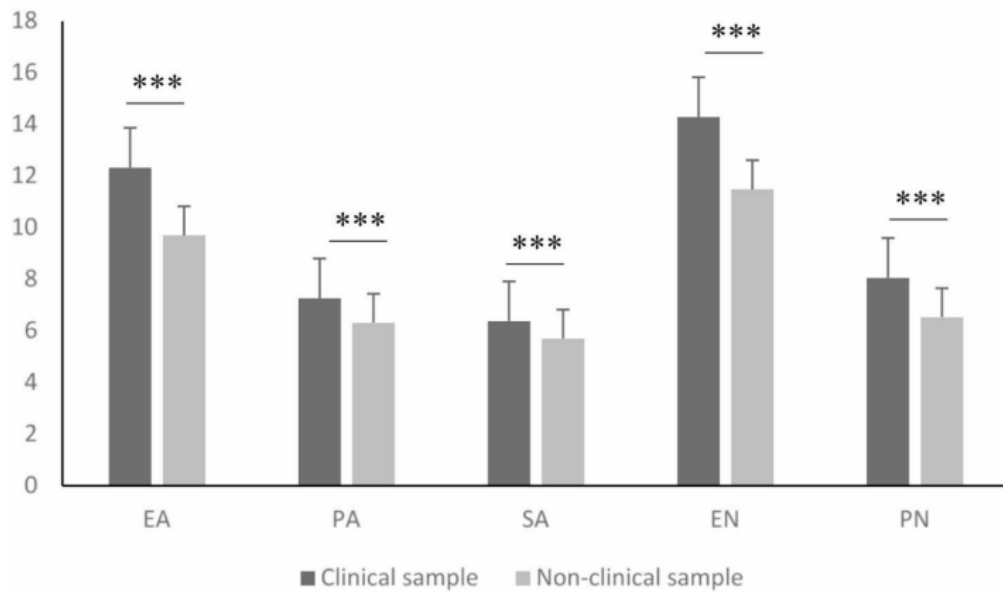
Figure 1. *Differences between the clinical (n = 252) and non-clinical (n = 347) samples in terms of CTQ subscales. Values represent mean + standard deviation. Statistics: Mann–Whitney U-test. *** p < .001*

The sample recruited at the Budapest site consisted of BPD, aADHD and screened control groups, in which subjects with comorbid aADHD and BPD, or healthy control subjects with subclinical symptoms were excluded as a result of the rigorous screening process. Using ANOVA analyses and Bonferroni post hoc tests, the BPD group differed significantly from the control group in each CTQ scale (EA, SA, EN scales p< .001, PA, PN scales p<.01), while there was no significant difference between the aADHD and the screened control group in any of the CTQ subscales. The BPD group had significantly higher values than the aADHD group in the EA, SA (p < .001), and EN (p < 0.01) scales, but was not different in the PA and PN scales (**Figure 2**) (67).
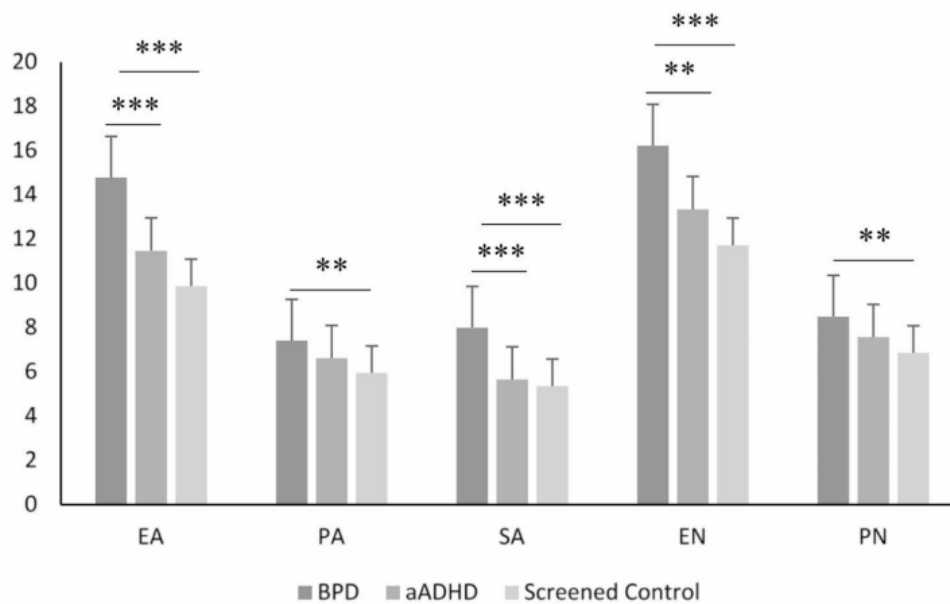
Figure 2. *The CTQ subscales in BPD (n = 60), aADHD (n = 78) and screened control groups (n = 98). Values represent mean + standard deviation. Statistics: one-way ANOVA followed by Bonferroni post hoc tests. ** p<0.01; *** p < .001*

2.1.4 Discussion

The main findings of this study are the following: 1. The five scales of H-CTQ-SF demonstrated adequate internal consistency and reliability that were similar to the English version of CTQ-SF. 2. The hypothesized five-factor model of the CTQ-SF fits well with the Hungarian version of the CTQ-SF, even after the removal of one item from the PN scale, due to its cross-loading onto the EN subscale. 3. The H-CTQ-SF effectively differentiated between clinical patients and the population sample, and also between the screened healthy control, aADHD and BPD groups. Early trauma in the aADHD group did not exceed the levels seen in healthy controls. 4. As a convergent validity measure, the H-CTQ-SF showed good correlation with relevant domains of the PID-5 questionnaire.

Internal Consistency and Factor Structure of the H-CTQ-SF

Cronbach's alpha values were satisfactory for the five subscales, ranging from 0.651 (PN) to 0.934 (SA), indicating excellent internal consistency for the H-CTQ-SF. Although the PN scale showed a somewhat lower alpha value, it remained above the

acceptable threshold of 0.50 for group comparisons. The lower PN alpha value appears to be a characteristic not only of the Hungarian version but also of the Chinese, Brazilian, Swiss, Spanish, Korean, Dutch, and Swedish versions(79-81, 83, 91-93), as well as the original English version (88). This may point to a fundamental limitation in the original construction of the PN subscale.

Principal component analysis (PCA) yielded a five-factor model explaining 68% of the variance. Only two cross-loadings were observed: items 2 and 4 loaded onto the EN scale instead of the PN scale. This finding may be influenced by the phrasing of "to take care" in the Hungarian translation, which evokes stronger emotional associations. Similarly, in the original study, factor loadings for the PN items were relatively low, and one subsequent study failed to demonstrate the factorial validity of the PN subscale. Other cultural adaptations of the CTQ have reported similar issues with the factor structure. This could stem from theoretical inconsistencies within the "physical neglect" construct. While it is conceptually relevant to distinguish PN from EN—paralleling the separation of physical and emotional abuse—Gerdner and Allgulander (2009) proposed additional constructs (93). In our sample, items 2 ("I knew that there was someone to take care of me and protect me") and 4 ("My parents were too drunk or high to take care of the family") loaded onto the EN scale. In other cultural adaptations, item 26 ("There was someone to take me to the doctor if I needed it") has also loaded onto the EN scale rather than the PN scale. These items reflect a lack of care, encompassing both physical and emotional dimensions. Meanwhile, the two items with the highest loadings on the proposed PN factor (items 1 and 6) pertain to basic needs such as food and clean clothes. Gerdner and Allgulander (2009) suggested categorizing these items under "lack of supervision" and further proposed "lack of care" as distinct but correlated factors (93).

In conclusion, the problematic internal consistency of the PN subscale and the low item loadings onto PN reflect not a deficiency in the H-CTQ-SF itself but rather inconsistencies in the construct validity of the original version. Additionally, the five-factor structure observed in this study aligns with findings from the original version, supporting its cross-cultural factorial equivalence (67).

Discriminative and Convergent Validity of the H-CTQ-SF

Consistent with previous research, the H-CTQ-SF effectively differentiated between clinical and non-clinical samples. Across all trauma domains, the clinical sample demonstrated significantly higher scores on each CTQ subscale, reinforcing prior findings discussed previously. Each CTQ subscale showed significant positive correlations, ranging from acceptable to moderate, with the analyzed subscales of the PID-5, indicating good convergent validity. These results align with recent studies highlighting the impact of early-life trauma on personality structure, which can mediate towards other symptom domains, e.g., dissociation or suicidal behaviour (85, 86).

The prevalence of early traumatization in aADHD and BPD Groups

The elevated levels of trauma across all domains observed in the BPD group, combined with the absence of significant differences between the aADHD group and the screened control group, suggest that the elevated trauma levels reported in previous aADHD studies may be linked to comorbid BPD. This interpretation is supported by findings from Rüfenacht (2021) (94). Consequently, the lower levels of childhood trauma identified in this study may not be representative of the broader aADHD population encountered in clinical settings, as individuals with comorbid BPD were excluded. Our results also indicate that environmental factors contributing to the etiology of aADHD may not be reliably assessed using the CTQ. While significant differences between the aADHD and BPD groups were observed in the EA, SA, and EN subscales, no significant differences were found in the PA and PN subscales. A recent review by Calvo (2020) examined the role of early trauma in the progression from ADHD in childhood to BPD in adulthood (95). Most studies analysed in the review identified an increased risk of children with ADHD, particularly those reporting emotional and sexual trauma, developing BPD later in life. Our findings similarly emphasize the importance of emotional neglect, emotional abuse, and sexual abuse in the development of BPD (67).

Limitations

Patients with comorbid aADHD and BPD were not included in this study, therefore, we lack data on the levels of early traumatization in this group. Discriminative validity and correlations were analysed only in a subsample. For convergent validity, instead of using another trauma-specific measurement tool, we administered the PID-5

personality questionnaire. PID-5 has been shown to correlate closely with trauma measures, still it does not directly assess early traumatization and should therefore be considered a suboptimal surrogate marker.

2.2 Second study

Emotion dysregulation and impulsivity as overlapping symptoms in adult Attention-Deficit/Hyperactivity Disorder and Borderline Personality Disorder:
severity profiles and associations with childhood traumatization and personality functioning

2.2.1 Objectives

a) To compare the factors of ED and IMP in a well-characterized clinical sample of aADHD and BPD patients without overlapping comorbidity and in HC subjects, in order to explore the divergent inhibitory profiles of these groups.

b) To explore the association of childhood trauma and self-regulatory impairments at trait and behavioral levels.

c) To test the potential role of ED and IMP between childhood traumas and personality functioning in a transdiagnostic setting.

2.2.2 Methods

Participants

Altogether 100 patients with aADHD and 63 patients with BPD were enrolled to the study, and 100 healthy adults were matched according to their age (between 18-36 years of age). A board-certified psychiatrist or clinical psychologist interviewed all patients in the BPD and aADHD groups. The diagnostic process was supplemented by the MINI 5.0 (71, 72) and the SCID-5-PD (73) interviews to support the clinical diagnosis and to detect potential comorbid disorders. Comorbid BPD cases detected by the SCID-5-PD were not involved in the aADHD group, while ADHD symptoms detected by the MINI 5.0 resulted in the exclusion from the BPD group to avoid the presence of both disorders. BPD patients who had no aADHD diagnosis in the past, but fulfilled 3 or more attention-deficit/hyperactivity symptoms according to the DSM-5 criteria of ADHD were excluded as well. The HC group consisted of 100 healthy subjects without psychiatric history, not using drugs regularly, and screened by Derogatis Symptom Scale's (SCL-90) (74) and by Conners' Adult ADHD Rating Scales (CAARS, 66-item version)(75). The t-scores of SCL-90's GSI scores needed to be lower than 70 points on each scale, as well

as the t-scores of CAARS' Inattention, Hyperactivity and Impulsivity domains. General exclusion criteria were the following: psychotic symptoms, intellectual developmental disorder, and visual or reading impairment, limiting the abilities of informed consent and assent.

The CAARS was used for assessing the ADHD symptoms, while Borderline Symptom Checklist's behavioural items (96) were used to assess borderline behavioural symptoms in each group. The Personality Inventory for DSM-5 (PID-5) (18, 59, 60) was also administered for the detailed measurement of personality traits. Overall, 5 personality domains were assessed: negative affectivity, detachment, disinhibition, antagonism, psychoticism. The demographic and clinical characteristics of the three groups including comorbidity and medication data are presented in **Table 7** (97).

Table 7. *Clinical and demographic characteristics of the aADHD, BPD and healthy control (HC) groups.* [a] *M=Male, F=Female.* [b] *For completed education, E=elementary, S=secondary, H=higher education,* [c] *Barratt Simplified Measure of Socioeconomical Status (BSMSS) accounts for an individual's parent's educational attainment and occupational prestige and combines that with the individual's own family's educational attainment and occupational prestige (97).*

	aADHD (N=100)	BPD (N=63)	HC (N=100)	F / χ²/H	p
Age (years, SD)	26.31 (4.71)	26.19 (4.51)	26.61 (4.59)	0.187	0.829
Sex (M/F) % a	52.0/48.0	20.6/79.4	44.0/56.0	16.102	**<0.001**
Level of education (E/S/H) % b	4.0/51.0/45.0	7.9/61.9/30.2	3.0/49.0/48.0	6.309	**0.043**
SES (BSMSS, SD)ᶜ	50.07 (8.73)	43.63 (11.80)	48.55 (10.69)	17.103	**<0.001**
Inattention/Memory problems (CAARS-A)	25.55 (6.35)	17.47 (5.80)	11.07 (5.94)	138.512	**<0.001**
Hyperactivity/Restlessness (CAARS-B)	20.862 (6.74)	14.70 (5.96)	11.30 (5.86)	57.606	**<0.001**
Impulsivity/Emotional lability CAARS-C)	18.98 (7.07)	18.57 (6.87)	9.61 (5.24)	61.921	**<0.001**
Problems with self-concept (CAARS-D)	11.47 (4.06)	13.55 (3.524)	6.24 (3.75)	74.316	**<0.001**
DSM-IV Inattentive Symptoms (CAARS-E)	19.01 (4.64)	12.50 (5.42)	6.59 (3.90)	179.782	**<0.001**
DSM-IV Ha-Imp Symptoms (CAARS-F)	15.39 (5.39)	10.33 (4.34)	7.49 (4.64)	64.266	**<0.001**
DSM-IV ADHD Symp. Total (CAARS-G)	34.40 (7.62)	22.83 (8.12)	14.07 (7.21)	173.292	**<0.001**
ADHD index (CAARS-H)	23.20 (5.20)	19.32 (5.78)	10.35 (5.47)	138.954	**<0.001**
Borderline Symptom Checklist – Behavior	16.73 (4.23)	22.52 (6.64)	14.65 (2.94)	49.385	**<0.001**
Distractibility (PID-5) Distractibility	2.29 (0.53)	1.71 (0.77)	0.88 (0.58)	124.18	**<0.001**
Impulsivity (PID-5) Impulsivity	1.34 (0.68)	1.48 (0.78)	0.63 (0.56)	36.012	**<0.001**
Irresponsibility (PID-5)	1.36 (0.619)	1.12 (0.63)	0.65 (0.47)	37.854	**<0.001**
Comorbidity					
Depression (%)	38.0	73.0	-		
Dysthymia (%)	5.0	22.2	-		
Suicidal risk: no/low/mid/high (%)	88.0/10.0/-/-	15.9/41.3/20.6/22.2	-		
(Hypo)mania (%)	-	3.2	-		
Anxiety (%)	27.0	76.2	-		
OCD (%)	1.0	7.9	-		
PTSD (%)	0.0	25.4	-		
Substance related (%)	12.0	22.2	-		
Anorexia (%)	0.0	7.9	-		
Bulimia (%)	0.0	11.1	-		
Medication data					
No medication (%)	43	20.6	84		
Methylphenidate (%)	49	-	-		
Atomoxetine (%)	1	-	-		
Bupropion (%)	2	-	-		
Other antidepressant (%)	4	55.6	-		
Antipsychotic (%)	-	30.2	-		
Mood stabilizer and Anticonvulsant (%)	-	30.2	-		
Anxiolytic (%)	-	31.7	-		
Other (%)	11	12.7	16		

Psychiatric assessments

Questionnaires

The DERS is a 36-item scale for the assessment of overall emotion dysregulation, and has six specific dimensions, e.g. nonacceptance of negative emotions, difficulties engaging in goal-directed behaviour and controlling impulsive behaviour when distressed, limited access to effective emotion regulation strategies, lack of emotional awareness, and lack of emotional clarity (98). The 11th version of the Barratt Impulsivity Scale (BIS-11)(99, 100) which has been in use for more than twenty years, distinguishes three factors: 1) attention 2) motor 3) non-planning impulsivity. The first factor refers to distractibility, the so-called cognitive impulsivity, the second means the impaired ability to inhibit motor stimuli and the latter refers to decision-making without consideration,

characteristic of lifestyle. The LPFS-SR is an internally very consistent scale and it displays large associations with other commonly used self-report measures of global personality problems. It provides scores on four LPFS personality function components of Identity, Self-Direction, Empathy, and Intimacy, which are all considered to be indicators of a single, global dimension of personality dysfunction in the LPFS. Identity and Self - Direction scales form together the Self domain, while Empathy and Intimacy form the Social domain of LPFS. (58).

Neuropsychological tests measuring behavioural impulsivity

To assess waiting and stopping impulsivity, selected tests of the CANTAB (Reaction Time: RTI, Rapid Visual Processing: RVP, and Stop Signal Task: SST) were used (35, 101). Although the RTI is designed for measuring the reaction time, and RVP for measuring psychomotor speed and attentional problems, these paradigms are also used for measuring waiting impulsivity by analysing the number and the probability of premature responses and false alarms, when the subject cannot wait until the presence of the stimulus. The waiting impulsivity related outcome measures are the RTI Simple/Five choice Error Scores (premature responses), the total number of trials where the subject made a response before the presentation of the target stimulus. In the RVP, the waiting impulsivity related measure is the total number of false alarms (RVPFA), when the subject presses the button in the absence of the target stimulus (either one, or two numbers from the whole sequence are presented). In the SST the main outcome measure is Stop Signal Task Reaction Time (SSTSRT), which is an average time required for successful stopping; longer SSTSRT indicates greater difficulty in interrupting actions, reflecting on stopping impulsivity (102). A computerized version of Rogers decision-making task was used to assess impulsive choice (103). This task is designed to measure decision-making under uncertainty and delay aversion, as participants must make probabilistic judgments and make bets based on their confidence in their choice. Among the different outcome measures describing decision making, we selected delay aversion for impulsivity profile analysis, because of the relevance as a distinct impulsivity factor. The more detailed description of the test, and the process of the outlier detection process, has been described elsewhere (97, 104).

Data analysis

The SPSS version 28 (105) and JASP 0.18.3.0 (106) were used for all statistical analyses. Group differences measured by self-report scales, were compared between BPD, aADHD and control groups using ANOVA analyses and Bonferroni post hoc tests. Neuropsychological test results were compared by either ordinal/logistic regression, or univariate ANOVA analyses, depending on data structure. Mostly ordinal regression was used, and comparison contained logistic regression slopes and significance values. Descriptive statistics contained mean, standard deviation and median. RTI five choice error score was analysed by logistic regression and Cox & Snell and Nagelkerke R^2 were used to show the effect sizes of main the effect of group. Comparison contained odds ratios (OR) and significance values. Descriptive statistics contained percentages. In case of SSTSRT univariate ANOVA was used - comparison contained the main effect of group and Bonferroni Post hoc. Descriptive statistics contains Mean and standard deviation. Delay aversion was analysed by repeated measures ANOVA using Bonferroni post-hoc tests. All analyses were controlled for gender and SES. Predictors in the background of trait impulsivity factors were analysed by linear regression, Gender and SES were included in the model as covariates. The mediator model was created in SPSS, according to Process v4 by Andrew F. Hayes. Childhood traumatization measured by the CTQ - SF as predictor variable, emotion dysregulation measured by DERS and impulsivity measured by BIS-11 as mediator variables, and the social domain of personality functioning, measured by LPFS - SR as outcome variable were predefined. We excluded the self-domain of LPFS from analysis, because of the overlap in self-regulatory items with DERS and BIS-11. We also created a 5-scale version from the DERS, while the "impulse" scale of DERS refers to impulsive behaviour. Each variable was standardized, and z scores were used in the analyses.

2.2.3 Results
Differences in demographic and clinical symptom characteristics

The three groups were balanced according to age, but a significant difference in gender ratios was observed due to the higher rate of women in the BPD group. There were also significant differences in SES and education levels, with lower levels of completed education and SES scores in the BPD group. Inattention/Memory problems (CAARS-A) and Hyperactivity/ Restlessness (CAARS-B) were the most characteristic to the aADHD

group, but the BPD group showed significantly increased scores in these domains compared to the HC group (aADHD > BPD > HC). The DSM-IV ADHD scores (Inattention, CAARS-E; Hyperactivity-impulsivity, CAARS-F) showed the same pattern, indicating significant differences (aADHD > BPD > HC). Impulsivity/Emotional lability was equally characteristic for both patient groups (aADHD = BPD > HC). The BPD group scored the highest on the Problems of Self-concept scale (BPD > aADHD > HC). We found significant differences in every domain of the Borderline Symptom Checklist and PID-5, except for antagonism. All demographic and clinical results of the three groups are presented in **Table 7**.
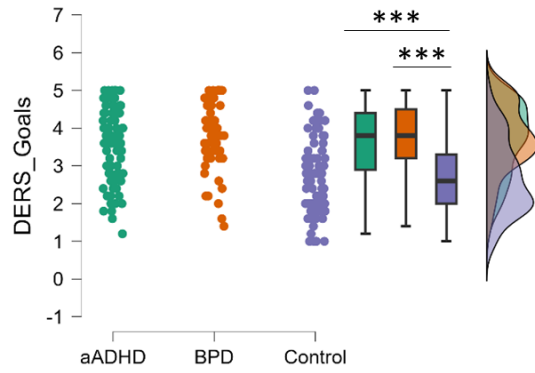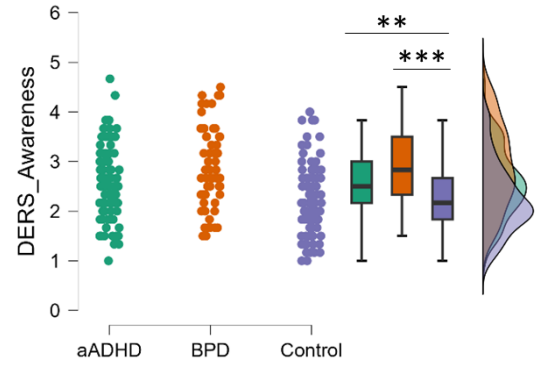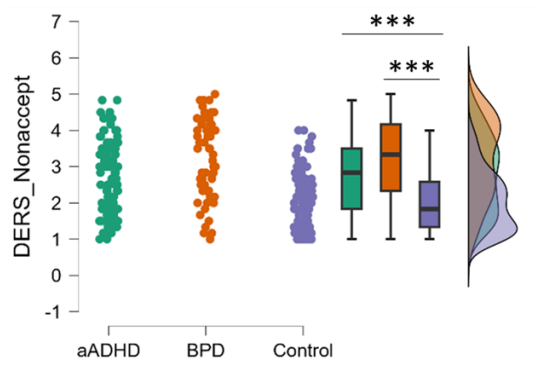
Emotional dysregulation and trait impulsivity profile in aADHD, BPD and control group

For the assessment of impulsive personality traits, i.e., self-reported attributions of self-regulatory capacity the Difficulties in Emotion Regulation Scale (DERS) and the Barratt Impulsivity Scale (BIS-11) were used. The total scores of these instruments significantly differed between the three groups. The highest DERS total score was reported in the BPD group, and the lowest in the HC group. The aADHD group was in-between, differing significantly from BPD and HC groups as well ($F(2, 247) = 64.206$; $p < .001$; part. $\eta^2 = .342$). BIS-11 total score was significantly higher in aADHD compared to BPD and HC groups, while the difference between BPD and HC was also statistically significant ($F(2, 248) = 36.744$; $p < .001$; part. $\eta^2 = .355$). The different emotional dysregulation and impulsivity subscales of DERS and BIS-11 are presented in **Table 8**, and visualised in **Figure 3.**

Table 8. *Emotional dysregulation and trait impulsivity profile in aADHD, BPD and control group (97).*

Variable	Group	N	M	S.D.	F (df1, df2)	p	partial η²	Contrasts	p
DERS	aADHD	94	2.746	1.027	29.266 (2, 247)	<0.001	0.192	aADHD>HC	**<0.001**
Nonacceptance	BPD	59	3.218	1.096				BPD>HC	**<0.001**
	HC	99	2.003	0.800				aADHD=BPD	0.069
DERS	aADHD	94	3.655	0.963	31.082 (2, 247)	<0.001	0.201	aADHD>HC	**<0.001**
Goals	BPD	59	3.736	0.891				BPD>HC	**<0.001**
	HC	99	2.687	0.978				aADHD=BPD	1.000
DERS	aADHD	94	2.612	1.005	42.503 (2, 247)	<0.001	0.256	aADHD>HC	**<0.001**
Impulse	BPD	59	3.314	1.069				BPD>HC	**<0.001**
	HC	99	1.857	0.706				aADHD<BPD	**<0.001**
DERS	aADHD	94	2.572	0.723	13.017 (2, 247)	<0.001	0.095	aADHD>HC	**0.003**
Awareness	BPD	59	2.896	0.823				BPD>HC	**<0.001**
	HC	99	2.227	0.689				aADHD=BPD	0.125
DERS	aADHD	94	2.646	0.845	62.808 (2, 247)	<0.001	0.337	aADHD>HC	**<0.001**
Regulation	BPD	59	3.659	0.936				BPD>HC	**<0.001**
	HC	99	2.023	0.732				aADHD<BPD	**<0.001**
DERS	aADHD	94	2.261	0.764	40.820 (2, 247)	<0.001	0.248	aADHD>HC	**<0.001**
Clarity	BPD	59	3.048	1.011				BPD>HC	**<0.001**
	HC	99	1.778	0.639				aADHD<BPD	**<0.001**
BIS	aADHD	96	3.029	0.442	114.41 (2,248)	<0.001	0.480	aADHD>HC	**<0.001**
Attention	BPD	60	2.527	0.514				BPD>HC	**<0.001**
	HC	99	2.034	0.435				aADHD>BPD	**<0.001**
BIS	aADHD	96	2.224	0.441	22.071 (2, 248)	<0.001	0.151	aADHD>HC	**<0.001**
Motor	BPD	60	2.106	0.526				BPD>HC	**0.003**
	HC	99	1.815	0.351				aADHD v BPD	0.092
BIS	aADHD	96	2.392	0.446	31.173 (2, 248)	<0.001	0.201	aADHD>HC	**<0.001**
Nonplanning	BPD	60	2.317	0.429				BPD>HC	**<0.001**
	HC	99	1.937	0.390				aADHD=BPD	0.164

The two patient groups were significantly different from the control group in each subscale, but they also differed from each other as well. Emotional dysregulation was observable in both patient groups, with significant differences compared to the control group, but in each subscale the BPD group reached the highest scores, however the "impulse", "regulation" and "clarity" scales showed significant difference between the two patient groups. Attentional impulsivity was more characteristic to aADHD, motor and non-planning impulsivity showed no significant difference in the two patient groups (97).
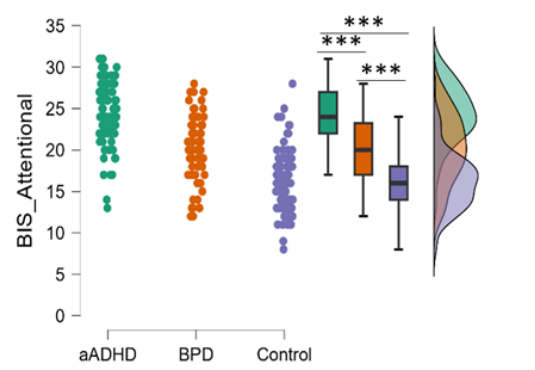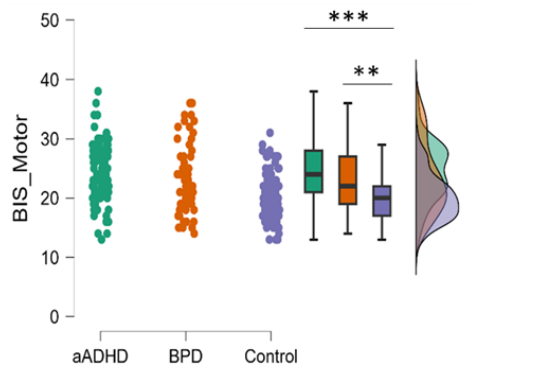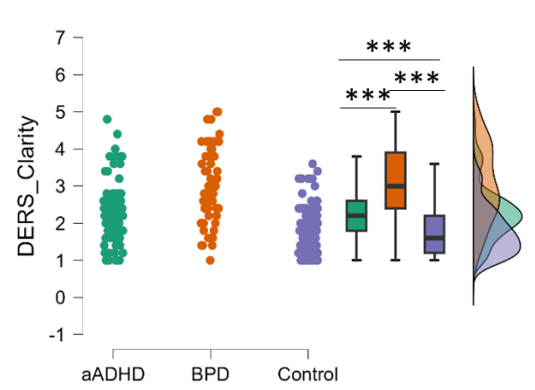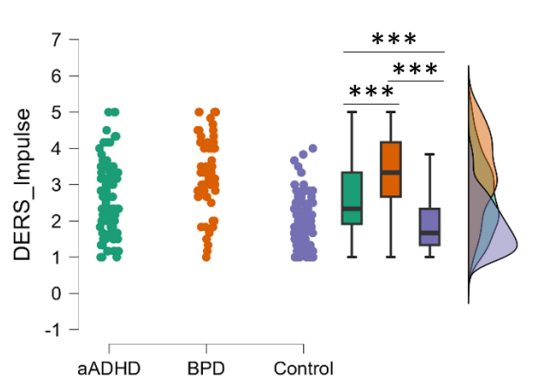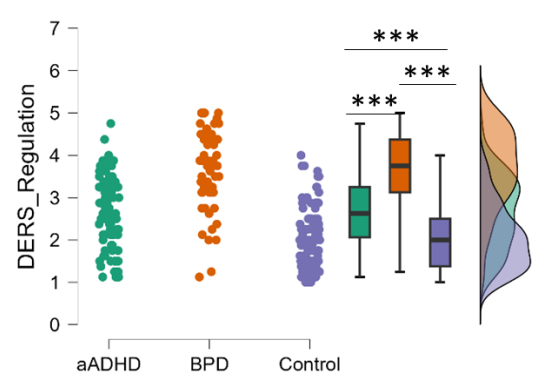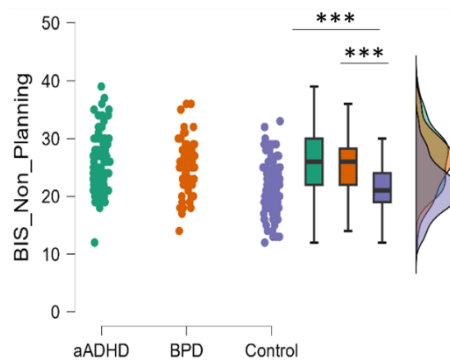
Figure 3. *Emotion dysregulation and impulsivity traits in the aADHD, BPD, HC groups. DERS: Difficulties in Emotion Regulation Scale; BIS: Barratt Impulsivity Scale 11th version (97).*

Neuropsychological measures of impulsivity profile in aADHD, BPD and control group

Waiting impulsivity was measured by CANTAB Reaction Time paradigm's premature responses and RVP's false alarms (**Table 9**).

Table 9. *Classification of the selected CANTAB subtests and variables according to the impulsivity factors (97).*

Impulsivity factor	CANTAB subtest	CANTAB variable
Waiting impulsivity (withholding action)	Reaction time (RTI)	RTI simple error score – premature responses (RTISESPR)
		RTI five choice error score – premature responses (RTIFESPR)
	Rapid Visual Information Processing (RVP)	RVP total false alarms (RVPTFA)
Stopping impulsivity (stopping ongoing action)	Stop Signal Task (SST)	SST stop signal reaction time (SSTSRT)
		SST direction error go trials (SSTDEG)
		SST direction error stop trials (SSTDES)

No significant difference was found between the three groups in the RTI "simple error score" variable. The "five choice error score" differed significantly between the aADHD and control group, while there was no significant difference between the BPD

and control group regarding premature responses. In the RVP task, when a digit sequence was the target - which means a more complex signal detection process - not only the aADHD but also the BPD group differed significantly from the control group.

In stopping impulsivity measures, which reflect on the subject's ability to stop ongoing actions, the aADHD group performed worse than the HC group. The SST stop signal reaction time (SSTSRT) was significantly longer in the aADHD group than the HC group. There was no significant difference between the BPD and HC group in terms of stopping impulsivity. The same implied for the direction errors at stop and go trials (**Table 10**) (97).

Table 10. *Comparison of impulsivity related CANTAB variables between aADHD, BPD and healthy control group (97).*

1 Ordinal regression - comparison contains logistic regression slopes and significance values. Descriptive statistics contains Mean and standard deviation and median. 2 Logistic regression – we used Cox & Snell and Nagelkerke R^2 as effect sizes of main the effect of group. Comparison contains odds ratios (OR) and significance values. Descriptive statistics contains percentages. 3 Univariate ANOVA - comparison contains the main effect of group and Bonferroni Post hoc. Descriptive statistics contains Mean and standard deviation. All analyzes are controlled for age, gender, and SES.

Variable name	aADHD	BPD	Control	Contrasts	Statistic value	p
RTI simple error score – premature responses [1]	M = 0.43 S.D. = 0.728	M = 0.30 S.D. = 0.638	M = 0.28 S.D. = 0.533	aADHD v HC BPD v HC aADHD v BPD	b = 0.321 b = 0.177 b = 0.144	0.328 0.664 0.720
RTI five choice error score – premature responses [2] /dichotomized because of skewness/	Percentage of error: 14%	Percentage of error: 6.3%	Percentage of error: 5%	Main effect of group	χ^2 (2) = 4.836 R^2 = 1.9–4 0.2%	0.089
				aADHD > HC BPD v HC aADHD v BPD	OR = 3.012 OR = 1/0.685 OR = 2.064	**0.045** 0.599 0.255
Stop signal task reaction time (SSRT) [3] (measured in ms)	M = 242.230 S.D. = 42.880	M = 228.147 S.D. = 47.222	M = 219.172 S.D. = 37.778	Main effect of group	F(2,248) = 7.609	< 0.001
				aADHD > HC BPD v HC aADHD v BPD		**< 0.001** > 0.999 0.081
SST Direction error – go trials [1]	M = 2.83 S.D. = 4.568 Med: 1.00	M = 1.54 S.D. = 2.657 Med: 1.00	M = 1.31 S.D. = 2.509 Med. 0.50	aADHD > HC BPD v HC aADHD v BPD		**0.019** 0.658 0.139
SST Direction error – stop trials [1]	M = 43.17 S.D. = 4.725 Med: 43.00	M = 42.21 S.D. = 4.080 Med: 43.00	M = 41.37 S.D. = 3.762 Med. 41.00	aADHD > HC BPD v HC aADHD v BPD		**< 0.001** 0.076 0.258

The task used for investigating decision making characteristics has several outcome measures, of which delay aversion was used for further analyses. Delay aversion represents the tendency to impatiently accept larger bets, when presented in descending order, but withstanding premature betting in the ascending condition. The interaction of group and winning probability was found to be significant ($F_{(2, 211)} = 4.996$; $p = .008$; partial $\eta^2 = 0.045$), and subjects in the BPD group had the tendency of impatiently accept larger bets despite of the low probability of winning in comparison with the aADHD and control group ($F_{(2, 211)} = 3.101$; $p = .047$; partial $\eta^2 = 0.029$), when the bets were presented in descending order (**Figure 4**). Upon ascending conditions, there was no statistically significant difference between the three groups in delay aversion ($F_{(2, 211)} = 0.344$; $p = .709$; partial $\eta^2 = 0.003$).
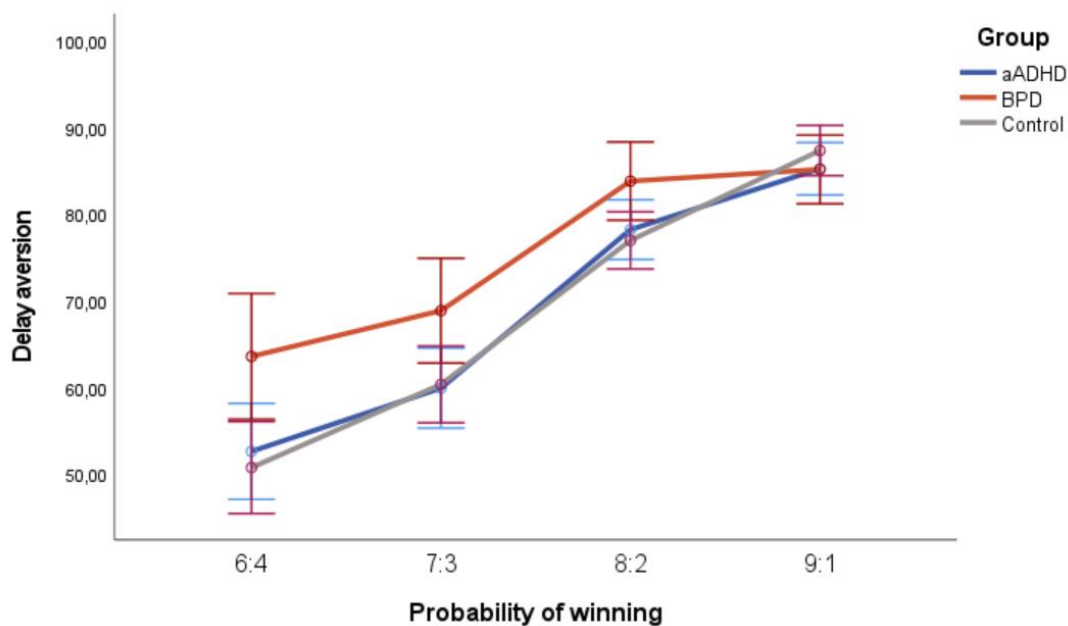

Figure 4. *Delay aversion in aADHD, BPD and control groups along the different probabilities of winning (97). On the X axis, the ratios means the numbers of the red/blue boxes, therefore the probability of winning. Delay aversion reflects on the time subjects can wait in order to adjust the bet to the winning probability. The bets were presented in a descending order, in 5 steps .*

The association of childhood traumatization with ED, trait and behavioral impulsivity

Using the total CTQ score, a categorical trauma severity score was derived, grouping subjects into low, medium and high trauma severity groups, based on the CTQ mean total score, and +/- 1 standard deviations as cut-off scores. First, the three study groups were compared in terms of trauma level. There was a significant difference between the groups ($\chi^2(4) =33.462$, $p < .001$, $V = .256$), demonstrating the validity of the grouping procedure. As expected by clinical experience, the BPD group was characterized by the highest proportion of highly traumatized subjects. The distribution of traumatization levels was comparable between the aADHD and HC groups (**Figure 5**).
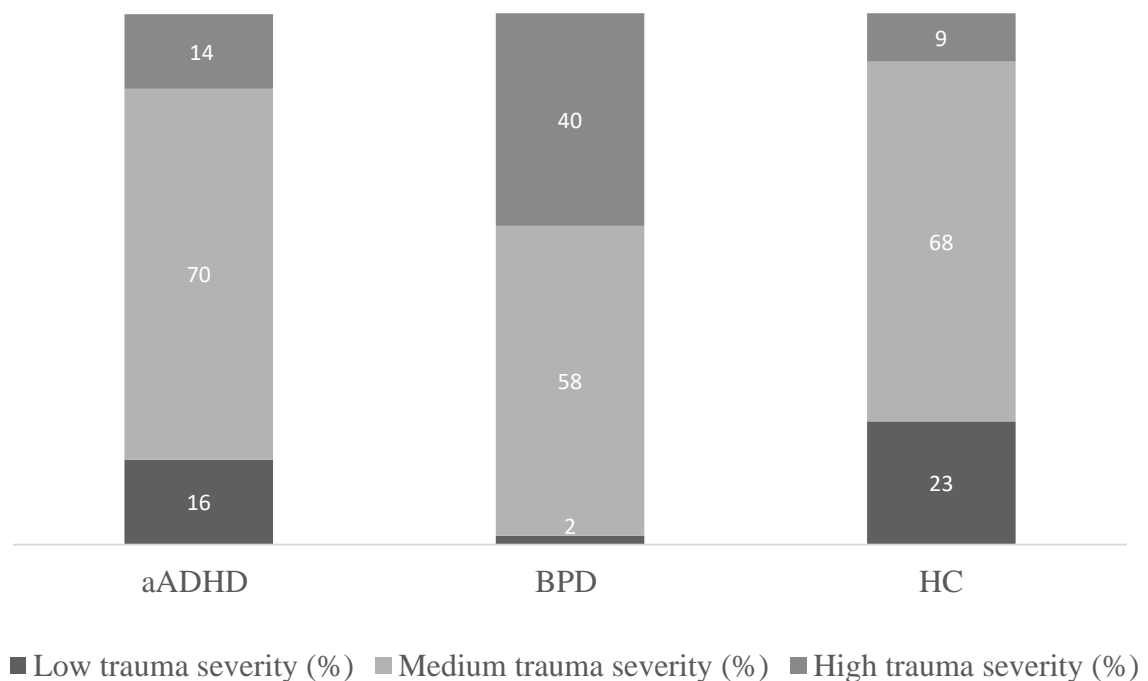
Figure 5. *Distribution of traumatization categories in the aADHD, BPD, and HC groups (97). The grouping subjects into low, medium and high trauma severity groups was based on the CTQ mean total score, and +/- 1 SD. Low trauma severity: score under CTQ mean total score – 1 SD. Medium trauma severity: CTQ mean +/- 1 SD. High trauma severity: score above CTQ mean + 1 SD. CTQ: Childhood Trauma Questionnaire – Short Form.*

A dimensional approach was used to detect associations between childhood traumas and ED and IMP factors in all subjects regardless of diagnosis, which offers powerful ways of assessing psychopathology, beyond the structures of current diagnostic

categories. Our hypothesis was, that the different factors of self-regulatory capacity are associated with childhood traumatization to a different extent.

Linear regression modelling was used to test to what extent gender, socioeconomic status (SES), and levels of traumatization predict ED and trait IMP. The conditions of regression met standard criteria.

The level of traumatization predicted both emotion regulation capacity and trait impulsivity. Gender predicted ED, but had no significant correlation with total IMP scores, while SES demonstrated significant correlation with trait IMP, but not with ED **(Table 11).** ED measured by DERS showed significant correlations with the CTQ total score $(F(3,250)=16.981; p<0.001; R^2_{Adj}=0.160)$ (**Figure 6)** while total impulsivity scores measured by the BIS-11 were also correlated with the CTQ total score $(F(3,250)=6.840; p<0.001; R^2_{Adj}=0.065)$ (97).

Table 11. *Predictors of emotion dysregulation and trait impulsivity. Linear regression models (97). Outcome variable: Emotion dysregulation (DERS): $R^2 = .170$ $R^2_{Adj} = .160$ $F(3, 250) = 16.981$ $p < .001$ Outcome variable: Trait impulsivity (BIS-11): $R^2 = .076$ $R^2_{Adj} = .065$ $F(3, 250) = 6.840$ $p < .001$*

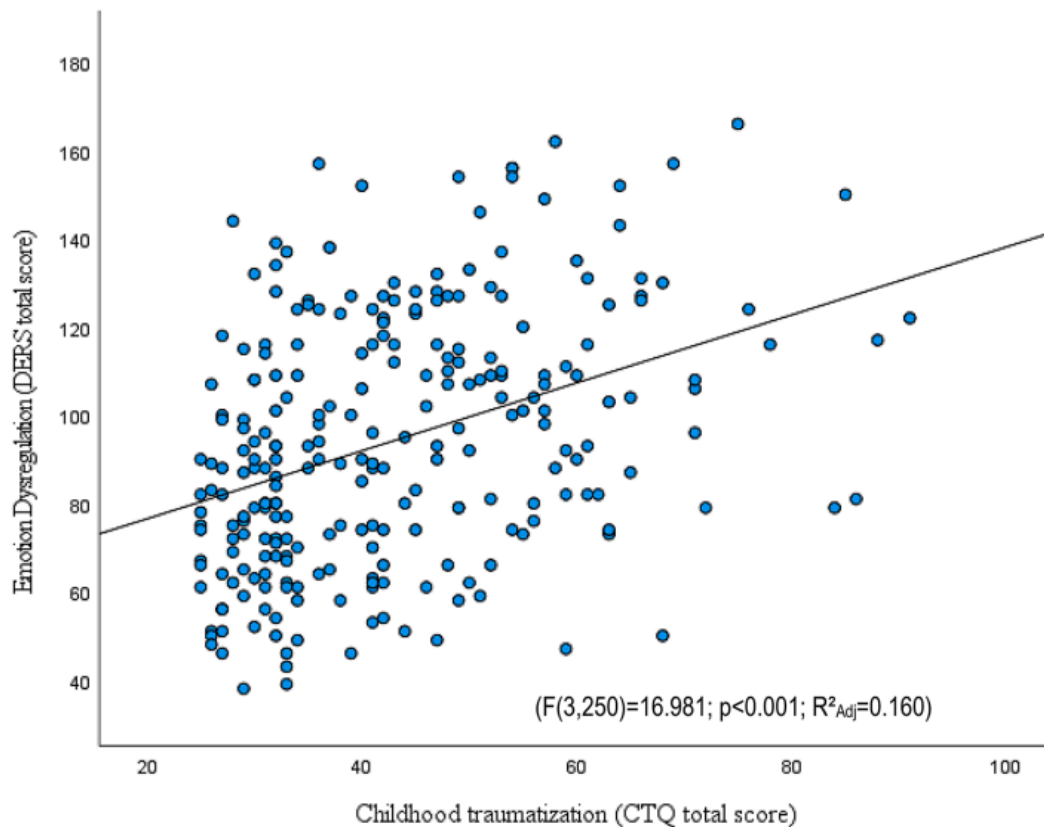| DERS	B	SE	β	t	p	tolerance
Constant	66.281	11.636		5.696	<0.001	
Gender	7.235	3.383	0.124	2.139	**0.033**	0.091
SES	−0.288	0.160	−0.106	-1.797	0.074	0.963
CTQ total	0.711	0.121	0.348	5.896	**<0.001**	0.960
BIS-11	**B**	**SE**	**β**	**t**	**p**	**tolerance**
Constant	66.604	5.519		12.069	<0.001	
Gender	−0.859	1.617	−0.032	−0.531	0.596	0.092
SES	−0.152	0.076	−0.124	-2.002	**.046**	0.961
CTQ total	0.208	0.058	0.224	3.603	**<0.001**	0.957

Figure 6. *The effect of childhood traumatization on emotion dysregulation (97).*

<u>The effect of traumatization on the neuropsychological measures of impulsivity</u>

The number of responses without target stimuli forms the false alarm outcome measure of CANTAB RVP Task. With increasing levels of childhood traumatization, the ratio of subjects who committed false alarms also increased (**Figure 7**). The difference was significant between the groups ($\chi^2(2) = 7.585$ p = .023 V = .172).

Stopping impulsivity showed no differences as a function of the level of traumatization (F (2, 252) = 0.703 p = 0.496 partial η^2 = 0.006).

Delay aversion level among uncertain conditions differed significantly according to the level of traumatization, namely, those who were the most traumatized, had the highest delay aversion scores (F (2, 169) = 3.192 p = 0.044 partial η^2 = 0.036).
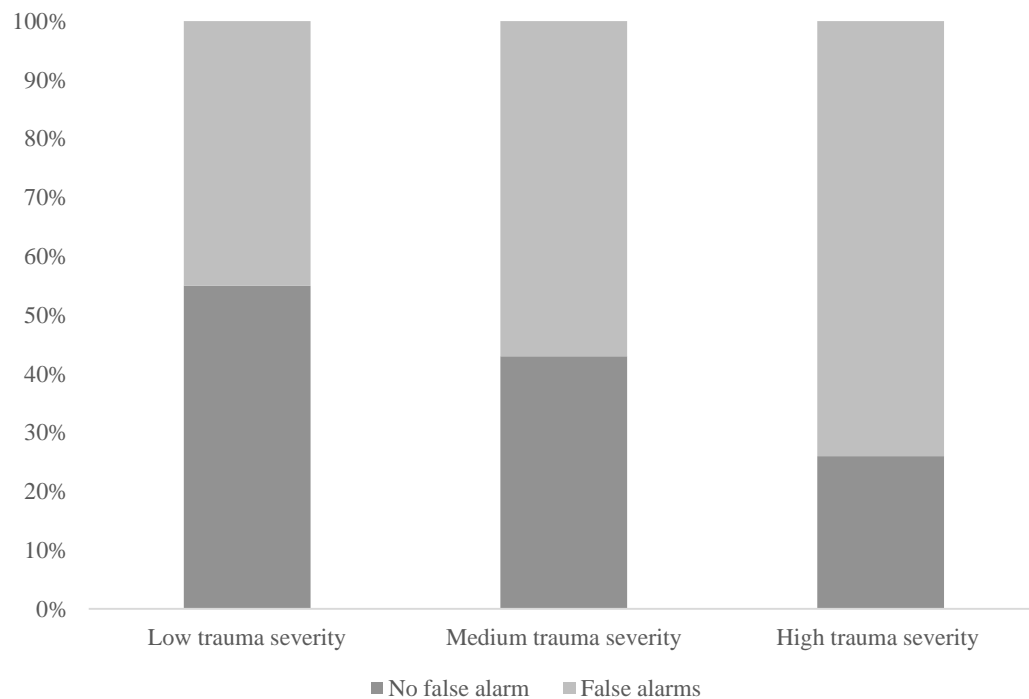
Figure 7. *The effect of childhood traumatization on waiting impulsivity (97). RVP total false alarm scores were dichotomized because of the skewness of distribution.*

<u>ED and IMP as mediators between childhood traumas and the social domain of personality functioning.</u>

To assess the role of ED and IMP in the background of personality functioning a mediation model was implemented. Childhood traumatization as predictor variable, ED and IMP as mediator variables, and personality functioning as outcome variable were predefined. We excluded the self-domain of LPFS from analysis, because of the overlap in self-regulatory items with DERS and BIS-11. We created a 5-scale version from the DERS, while the "impulse" scale of DERS refers to impulsive behaviour. Each variable was standardized, and z scores were used in the analyses. Standardized coefficients demonstrated that traumatization has a significant total and direct effect on personality functioning. Among the indirect pathways, only those remained significant, that contained ED as a mediator. This model also shows, that the detected association between trait impulsivity and childhood traumatization were mediated by ED (**Figure 8**) (97).
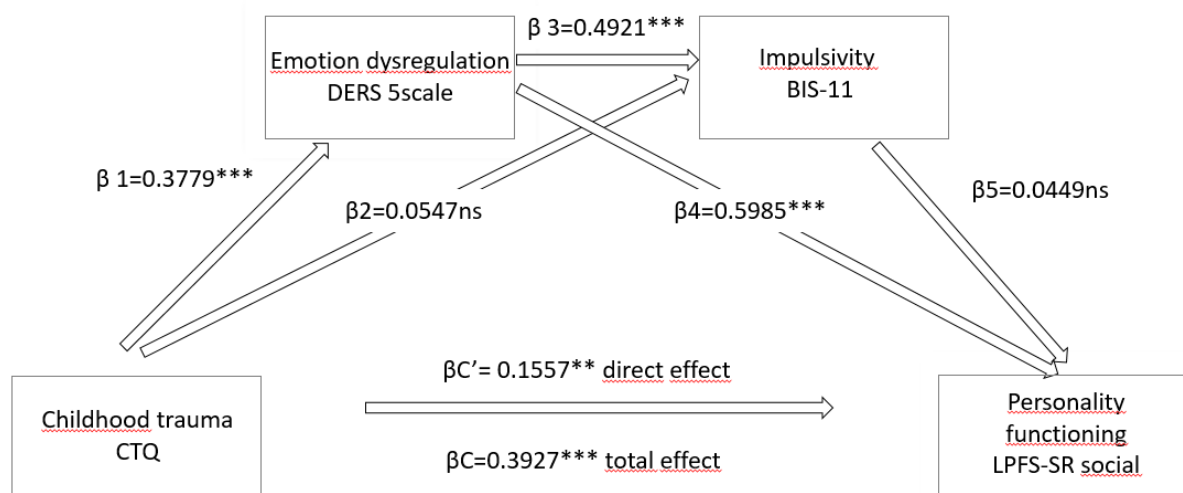
Figure 8. *Emotion dysregulation and impulsivity as mediators between childhood traumatization and the social domain of personality functioning (97). CTQ: Childhood Trauma Questionnaire – Short Form; BIS -11: Barratt Impulsivity Scale 11th version; DERS 5 scale: Difficulties in Emotion Regulation Scale without the impulsivity subscale; LPFS – SR social: Level of Personality Functioning Scale – social domain.*

2.2.4   Discussion

Emotion dysregulation and impulsivity trait profile in aADHD, BPD: overlapping symptoms with different characteristics

ED, IMP, and according to the self-reported results of our study, even inattention, are overlapping symptoms of aADHD and BPD. However, disorder-specific characteristics of these constructs have not yet been clearly defined. In this study, we assessed the inhibitory profiles of both patient groups avoiding the bias effect of aADHD - BPD comorbid cases. From a clinical perspective, the DSM-5 diagnostic criteria show significant differences in how impulsivity is defined in these disorders (1). Self-reported inhibitory capacity measured by the DERS and the BIS-11, revealed marked differences between the aADHD, BPD, and HC groups. The DERS total score was the highest in the BPD group, and the lowest in the HC group, with the aADHD group demonstrating significant differences compared to both. In each DERS subscale the BPD group consistently had the highest nominal scores, however the impulse (controlling impulsive behavior when distressed), regulation (limited access to effective emotion regulation strategies) and clarity (lack of emotional clarity) scales showed significant difference

between the two patient groups which are align with previous studies. The impulse subscale of DERS has the most overlap with the "negative urgency concept", affective instability driven impulsivity. Linhartová et al. found that the only significant trait impulsivity difference between BPD and aADHD patients was negative urgency, with higher scores in BPD patients (35). In the study of Krause - Utz et al. not only the BPD, but also the clinical control group expressed increased negative urgency (2). The regulation and clarity subscale of DERS refers to the capability of recognizing emotions and the lack of adaptive regulation strategies. The elevated DERS scores found in BPD relative to aADHD are consistent with the results of Rüfenacht et al., who found that aADHD patients have a better control over their emotions with higher use of adaptive cognitive strategies and lesser use of non-adaptive strategies than BPD patients (31). The BIS-11 impulsivity total scores were the highest in the aADHD group in our study, the BPD group demonstrated intermediate levels that differed significantly from both the aADHD and HC groups, similarly as reported by Lepouriel et al. (36). As expected, the BIS-11 attentional scores were significantly higher in aADHD compared to BPD and HC groups. In summary, the self-regulatory profile, measured by self-reported questionnaires differed across the groups. As predicted, ED was more prominent in BPD, while impulsivity was more characteristic of aADHD.

Using the Conners' Adult ADHD Rating Scale (CAARS), the aADHD group scored the highest across all domains, except for the Problems with Self-Concept scale. Nevertheless, the BPD group also demonstrated significantly elevated scores in each ADHD domain compared to the HC group. Notably, the CAARS includes a subscale for Impulsivity and Emotional Lability (CAARS-C), which combines these two features. Consequently, the disorder-specific differences between IMP and ED—detectable separately using the DERS and BIS-11—were not observable with this measure.

A potential explanation for the ADHD-like characteristics observed in BPD through self-report questionnaires may be trauma-related. Traumatization can make children to feel agitated, nervous, restless, or hyper-alert—behaviors that may be misinterpreted as hyperactivity. Similarly, symptoms that resemble inattention or concentration difficulties in traumatized children may instead reflect dissociation or efforts to avoid trauma reminders (107). A similar mechanism might also operate in adults

living with BPD, further complicating the differentiation between trauma-induced behaviors and genuine ADHD symptomatology (97).

Behavioral measures: waiting/stopping impulsivity and delay aversion

Waiting impulsivity was measured with (Reaction Time) RTI and (Rapid Visual Processing) RVP subtests of CANTAB battery. The aADHD group demonstrated elevated levels of waiting impulsivity in both subtests. The BPD group did not differ from the control in premature responses on the RTI, while in the RVP test, the BPD group showed an increased number of false alarms. Thus, BPD group exhibited ambiguous, or intermediate results regarding waiting impulsivity in our sample.

In former studies individuals with BPD have been found to exhibit heterogeneous results in neuropsychological tests often attributed to the high rate of comorbidities including affective disorders, substance use, and ADHD (38). Recent research suggests that, BPD patients may display intact waiting and stopping impulsivity under emotionally neutral circumstances (37, 40, 41). In our sample – despite excluding participants with ADHD comorbidity from the BPD group - waiting impulsivity, measured by the RVP false alarms was observed in the BPD group as well as in the aADHD group. This finding may be explained by the specific parameters of the RVP test (e.g. detecting a 3-digit sequence at a speed of 100 digit/minute), which demands highly precise signal detection compared to the simpler Go/No-Go tests used in previous studies of waiting impulsivity. Another possible explanation is that this form of impulsivity was associated with the level of traumatization in our sample, reflecting a decreased ability to withhold actions among BPD patients. Stopping impulsivity was increased in aADHD, but not in BPD, which aligns with previous studies (26, 39). Delay aversion measured by the Rogers' decision making task was characteristic only for the BPD group. Significant differences were observed under specific conditions when the probability of winning was very low. Under these uncertain conditions, BPD patients tended to place earlier and larger bets than the control group. Conversely, the aADHD group showed delay aversion profiles similar to those of the control. This test itself is complex, with more outcome measures that are not specifically referring to delay aversion. Conditions change throughout the test, and it takes time for subjects to understand when to wait for betting. This might be the reason, that differences were not significant among other conditions. However our results supports former publications, which found delay aversion relevant

to BPD (39-41). In summary, our results corroborate the multifaceted and disease-specific nature of impulsive behaviour (108).

Childhood traumatization and its associations with ED and IMP factors

The experience of traumatic events in childhood, especially those that can influence emotional maturation, is considered as a predisposing factor for the later development of ED and IMP, reviewed by Calvo et al. (95) The results of our trans-diagnostic linear regression analyses support these findings, while trauma score predicted both ED and IMP traits. In the case of ED, gender was also a significant predictor, while in the case of impulsivity, SES was found to have significant predictive effect.

Waiting impulsivity, measured by the RVP total false alarms, was associated with traumatization level: the rate of subjects committing false alarms increased with the severity of childhood traumatization. However, this association gives no insight into the process whether attentional deficit, i.e. poor quality of signal detection, or reduced inhibitory capacity or a combination of both, are responsible for these results, nor to what extent these factors mediate the effect of traumatization. The association of RVP total false alarms and elevated level of trauma may correspond with the phenomenon of arousal regulatory problems and hyper alertness: patients coming from traumatized milieu seem to detect threat in the absence of actual triggering stimuli, resulting in hyper-reactivity (109, 110). This behavior might be based on false signal detection and/or inhibitory control deficit.

We found no associations between stopping impulsivity and the level of traumatization, which might be a consequence of the sex-dependent nature of maltreatment-related reorganization of the brain inhibitory control network, resulting in poorer response inhibition among males (111). In our sample, females were overrepresented, which enhances the ecological validity of the findings. This sex-dependent nature of inhibitory control may also explain why stopping impulsivity appears to be intact in various BPD samples across studies (24, 35).

Delay aversion level among uncertain conditions differed significantly according to the level of trauma. Those who were most traumatized, had the highest delay aversion scores, regardless of the diagnosis. This association gives a potential insight into coping with a chaotic, traumatizing milieu, which was characteristic to the BPD group to the

greater extent. Where the future is not predictable, the short term gains become more important and therefore it can be considered as a relevant coping strategy (97).

<u>Emotion dysregulation as mediator between childhood trauma and adult personality functioning</u>

Several studies have suggested that traumatic childhood experiences are associated with personality disorders, depression, anxiety, addictions, suicidal behaviour, obesity (44, 49, 54, 112-114), but according to our best knowledge, there has not been studies published about the mediating effect of emotion dysregulation and impulsivity between traumatization on DSM-5 personality functioning. Our aim was to assess the role of traumatization across diagnostic categories, and find potential mediators in a trans-diagnostic analysis. In our sample childhood traumatization had a significant total and direct effect on the social domain of adult personality functioning, but among indirect pathways only those were significant which contain ED as a mediator. ED seems to mediate the effects of traumatization on impulsivity as well (97).

However, it is crucial to acknowledge that the correlational design applied does not allow causal conclusions to be drawn between childhood traumatization, ED, IMP and personality functioning. Therefore, it is essential for future research to investigate these phenomena in prospective, well-designed studies.

Limitations of the study need to be acknowledged. We cannot report about aADHD - BPD comorbid cases, because they were not involved in our research study. According to the MINI 5.0 interview, the prevalence of comorbidies were higher at the BPD group than in the ADHD group, which has a potential impact on the impulsivity measures. The sex ratio was different in the aADHD and BPD group, therefore we included sex as cofactor in each analysis. The results of self-reported scales are subjective, and there are more suitable self–reported scales for measuring impulsivity, i.e. the UPPS-P Impulsive Behavior Scale, which measures negative urgency, a factor which seems to be able distinguish BPD from aADHD. The concept of negative urgency combines affective instability and impulsivity, and the importance of this combination for BPD was emphasized in previous studies (35).

2.3 Third Study

Comparative efficacy of Schema Therapy (ST) vs. Nature - Adventure Based Schema Therapy (N-ABST) for improving personality functioning and assessment of the potential mediator effects of basic needs and emotion regulation

2.3.1 Objectives

The aim of this study was to compare the therapeutic efficacy of Schema Therapy (ST) vs Nature-Adventure Based Schema Therapy (N-ABST) in short and mid-term improvement not only in symptom severity but also in personality functioning and to assess the levels of fulfilment of the basic needs and emotion dysregulation as potential mediators. While the results of this third study have not been published so far, the study design will be presented in the framework of my doctoral thesis.

2.3.2 Methods

Combination of Nature-Adventure Therapy with Schema therapy - The theoretical concept

While developing the program it was realized, that N-AT has many strengths that complements schema therapy well and can be connected to the five domains of basic needs according to ST theory, which are outlined in **Table 12.**

Table 12. *The basic needs according to ST theory and the strengths of N-AT*

Basic needs in ST	Strengths of N-AT
Safe attachment	Build trust and be involved in the group
Autonomy – competence	Improve decision making, develop autonomy
Acceptance of emotional needs	Express needs and emotions
Spontaneity	Experience spontaneous, healthy, childish part
Consistent, realistic boundaries	Making the cognitive structure "visible"

At the Psychotherapy unit of the Department of Psychiatry and Psychotherapy Semmelweis University, schema therapy program has been implemented more than 15 years ago, and in the recent years the program headed towards experience based technics and methodology more and more, e.g. schema mode drama. Patients admitted to the department are diagnosed with personality disorders, mainly BPD, or anxiety and mood disorders. In general, 12-16 patients/month participate in the 4-week psychotherapeutic process. Besides ST, art-, biblio-, and movement therapy are also part of the program. From 2022. April 4-week full schema-therapy programs (ST) and Nature-Adventure based Schema Therapy programs (N-ABST) were running alternatingly.

Patients took part in the N-ABST program spent every Wednesday, and Friday in the woods, at a hilly part of Budapest in a forest environment, from 10 AM-4 PM. Adventure therapists were involved to deliver the outdoor content of the program. On the 3rd weekend a three-day long expedition was also a part of the N-ABST program, when the group spent 2 nights in the wild, in a natural environment close to Budapest facing different challenges, activities with concrete therapeutic goals. Altogether 5 N-ABST groups were organized, with the same protocol and staff (70).

Participants

The participants of the study were inpatients, diagnosed with different forms of personality disorders, bipolar affective, depressive, anxiety, eating, dissociative and impulse control disorders.

Inclusion Criteria were the same on both study arms

1. Diagnosed according to DSM-5 criteria and treated at the Department of Psychiatry and Psychotherapy of Semmelweis University, who have given informed consent to the study, which was confirmed in writing.

2. Age above 18

3. Committment to 4 weeks of treatment in hospital (hospital stay including weekends)

4. Current admission under the care of the Semmelweis University, Department of Psychiatry and Psychotherapy, Psychotherapy Unit

5. Willingness to participate in follow-up (after 3 months)

Exclusion Criteria:

1. Patients with current diagnosis of a psychotic disorder, cognitive impairment, brain injury, with limited ability to give informed consent are excluded.

2. Any physical handicap, which could make the patients doubtful in taking part in the outdoor exercises were thoroughly evaluated and individually decided after given comprehensive information about the program.

Those who did not meet the inclusion criteria were not involved in any of the study arms, however were able to take part in Schema Therapy program, and data were not used for study purposes. Altogether 127 participants were involved in the study, 50 patients started therapy on the N-ABST arm, 77 patients on the ST arm. 12 patients dropped out from the program, 4 from the ST, 8 from the N-ABST arm. Patients were diagnosed by board certified psychiatrists. Clinical diagnosis was supported by using MINI 5.0 and the SCID-5-PD interview for personality disorders (**Figure 10). The** CTQ was administered for measuring the trauma level. There were no significant differences at baseline between the two study groups in terms of age, sex, education, socioeconomical status, the severity of personality disorder and the level of childhood traumas (**Table 13)** (70).

Table 13. The sociodemographic characteristics of the participants [1]M: male, F: female, O:other, [2]BSMSS: Barratt Simplified Measurement of Social Status, [3]Personality Disorder Severity – ICD-11

	N-ABST (n=42)	ST (n=73)	F/χ^2	p
Age (years)	32.30±10.73	32.56±11.45	0.15	0.904
Sex (M/F/O) %[1]	20.9/76.7/2.3	30.1/64.4/5.5	2.082	0.353
Edu (years)	14.19±3.30	14.75±5.54	0.364	0.548
SES (BSMSS)[2]	41.09±14.67	43.53±12.99	0.849	0.359
PDS-ICD-11[3]	15.26±4.83	16.37±5.22	1.303	0.256
CTQ trauma score	8.42±3.67	8.49±3.78	0.011	0.907

Psychiatric assessments

Self-report questionnaires were administered three times: at baseline (T0), at the end of the 4-week program (T1), and at the end of the 3 month long follow-up period (T2) (**Figure 9).** The main outcome measures were the Derogatis Symptom Checklist (SCL-90-R) and the DSM-5 Level of Personality Functioning Scale (LPFS-SR). The Difficulties in Emotion Regulation Scale (DERS) was also administered at each time

point as a potential mediator of therapeutic effect. A new questionnaire, the Core Needs Questionnaire was developed in order to measure the fulfilment of the basic needs during therapy week by week. CNQ is a 20 item self-report questionnaire which was designed for measuring the level of fulfilment of the core needs of personality (e.g. safe attachment, autonomy-competence, acceptance of emotions, needs, spontaneity, consistent boundaries) according to the schema therapy theory by Jeffrey Young (115). Each item is linked to one domain, but the questionnaire was used as a global measurement of the level of fulfilment at the end of each week (70).
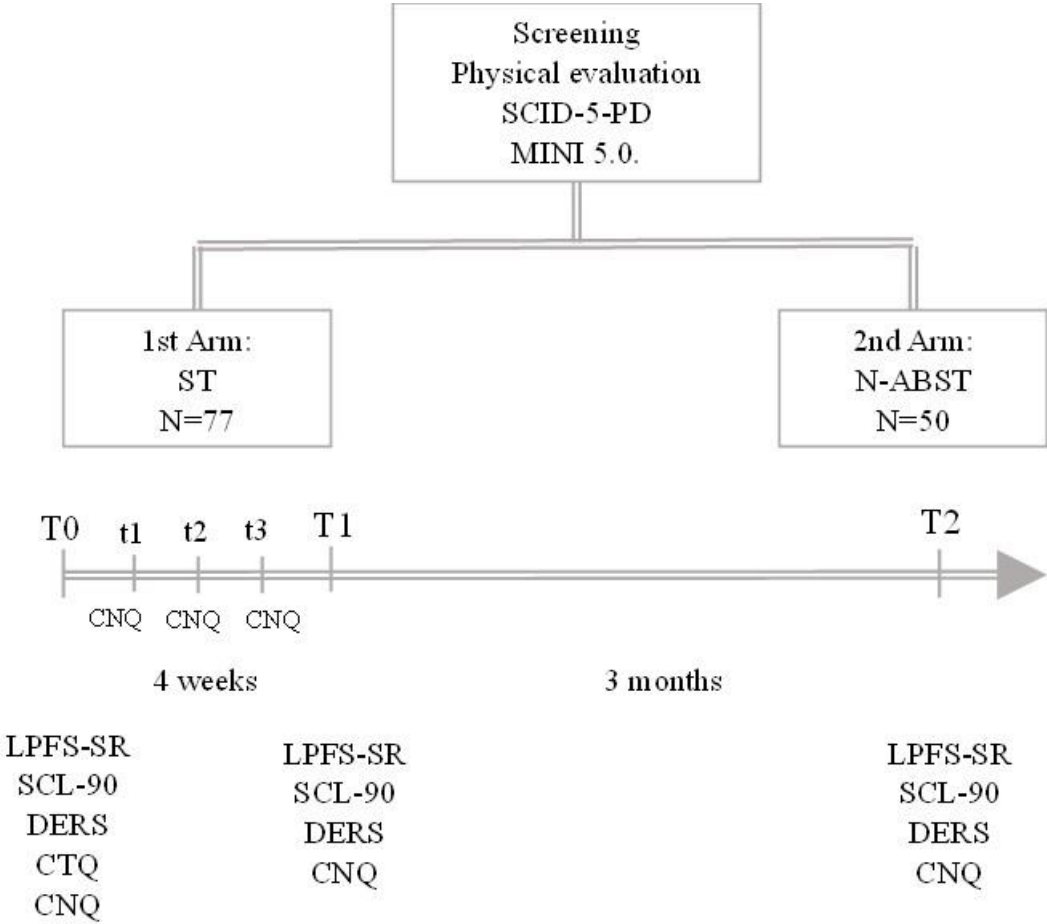
Figure 9. *Study design: ST vs N-ABST for patients entering psychotherapeutic treatment*

Our hypotheses were the following: One of the greatest strengths of experiential methodology is the emotional, physical and cognitive involvement of the person, which results in memorable experiences, therefore these results are long lasting in comparison with techniques involving mainly the cognitive part of the personality.

1. N-ABST will be as effective as classical ST short term, or even more effective in terms of social functioning measured by the LPFS-SR social domain.

2. Because of the high degree of personal involvement in N-ABST, resulting strongly imprinted memorable experiences, the therapeutic effect at follow-up will be greater in the N-ABST arm compwred to the only ST arm.

3. Both programs cover the core needs of a child, according to the Young schema therapy theory. The level of fulfilment will be strongly associated with the level of improvement.

4. The improvement in emotion regulation measured by DERS will be associated with the level of improvement and serves as a mediator of change.

Our results were presented on different conferences, but have not been published yet, therefore are not part of this thesis. The study design is shared on the website of the Open Science Foundation (OSF) and some preliminary results will be presented in the presentation (70).

3.   Conclusions

In Hungary, no psychological instruments had been available for measuring childhood trauma in a non-invasive and ethically sound way with good reliability and validity. The Hungarian version of the Childhood Trauma Questionnaire Short Form (H-CTQ-SF) has adequate internal consistency and reliability values and effectively differentiates between the clinical and non-clinical samples. Principal component analysis demonstrated that the five-factor model excellently fits the Hungarian version. The H-CTQ-SF effectively discriminated the aADHD and BPD groups, and demonstrated significant correlation with dysfunctional personality traits, measured by PID-5.

Because of its excellent psychometric properties, the H-CTQ-SF can be considered as an important clinical tool that can be used by professionals not only in the field of research, but also in patient-focused psychiatry and psychotherapy.

Early traumatization in our aADHD sample without the BPD comorbid cases was significantly lower compared with the BPD group, and was not different compared to the healthy control group. The lack of significant differences between aADHD and the

control group in terms of early traumatization leads to the question, whether the elevated level of traumas found previously in aADHD samples might be a consequence of comorbid BPD. Consideration of trauma patterns is a crucial part of diagnostic and the therapeutic work as well. This study fills a gap in terms of measuring the psychometric properties of H-CTQ-SF, an easy-to-administer, non-invasive, ethically sound questionnaire in Hungarian. Our findings also support the role of emotional abuse, sexual abuse and emotional neglect in the development of BPD, and also provide insight into a much less studied area, the role of traumatization in aADHD cases without comorbid BPD.

Assessing the inhibitory profile in aADHD and BPD helps us to understand the different factors of emotion dysregulation and impulsivity in these two disorders, which can be taken into consideration as an important aspect in differential diagnostics and can serve as a basis for psychotherapy. Both patient groups differed significantly from the HC group in each ED and impulsivity domain, but the profile was different. Self-reported symptoms of inattention, restlessness, and impulsivity in BPD can be either signs of potential ADHD comorbidity, or childhood trauma related symptoms, or both. The evaluation of the level of traumatization is essential in diagnostics and in treatment planning. Future research should explore longitudinal associations and the effect of clinical intervention in these patient groups. Impulsive symptoms seen in behaviors such as substance misuse, unsafe sexual activity, disordered eating and impulsive self-harm as well, underscores their importance as a trans-diagnostic trait. Childhood traumatization seems to strongly associate with ED, and affects several domains of impulsivity as well. Childhood traumatization had a significant total and direct effect on adult personality functioning in our whole sample, but ED seems to mediate the effects of traumatization on impulsivity, therefore targeting ED by psychoeducation, pharmacological treatment or psychotherapy may have a valuable impact on personality functioning.

In our therapy efficacy study both ST and N-ABST resulted in a significant symptom reduction measured by the SCL-90 global severity index and improved personality functioning at both self and social domains. The N-ABST program was more efficient in reducing anxiety, depression, somatization, phobia and this effect remained stable at the time of follow up, after 3 months. ST had a greater effect on obsessive-compulsive symptoms, interpersonal sensitivity, paranoia and psychoticism – at short-

and mid-terms as well. This study gives insight into the delivery of personalized treatments. By analysing the mechanisms of change, emotional regulation, and the fulfilment of the basic needs, we can expolre which variables correlate significantly with therapeutic efficacy, and mediate the effect of therapy.

4. Summary

Introduction Emotional dysregulation and impulsivity are characteristic symptoms of various psychiatric disorders, including borderline personality disorder (BPD), attention deficit hyperactivity disorder (ADHD), as well as mood, eating, and impulse-control disorders.

Methods The aim of this research was to investigate different factors of emotional dysregulation and impulsivity (personality trait, impulsive action, and choice impulsivity) and their association with the extent of childhood trauma in adult ADHD (aADHD) and BPD. Furthermore, we examined the potential mediating role of trauma in personality functioning. Additionally, we aimed to assess the efficacy of nature-adventure-based schema therapy (N-ABST) to gain insight into psychotherapeutic options for self-control issues. In Hungary, no reliable, easy-to-use, ethically sound, and validated questionnaire was available for assessing childhood trauma. Therefore, as an initial step, we validated the Hungarian version of the Childhood Trauma Questionnaire Short Form (H-CTQ-SF).

Results The H-CTQ-SF demonstrated excellent psychometric properties, making it an important clinical tool applicable not only in research but also in psychiatric and psychotherapeutic practice. The level of childhood trauma in the aADHD group (without comorbid BPD) was significantly lower than in the BPD group and did not differ from the healthy control group. Both patient groups significantly differed from the control group in all factors of emotional dysregulation and impulsivity, though their profiles varied in several aspects. The extent of childhood trauma had both direct and indirect significant effects on adult personality functioning in the entire sample, but emotional dysregulation primarily mediated these effects on personality.

Conclusions Exploring inhibitory profile patterns in aADHD and BPD can aid differential diagnosis and serve as a foundation for psychotherapy. Therefore, addressing emotional dysregulation through pharmacological and psychotherapeutic interventions may have a significant impact on personality functioning.

Magyar nyelvű összefoglaló

Bevezetés Az érzelemszabályozás zavara és az impulzivitás számos pszichiátriai zavar, például borderline személyiségzavar (BPD), figyelemhiányos/hiperaktivitás zavar (ADHD), hangulat-, evés-, valamint impulzuskontroll zavarok jellemző tünetei.

Módszerek Kutatásom célja az érzelemszabályozás és az impulzivitás különböző faktorainak (személyiség vonás, impulzív akció, döntési impulzivitás) vizsgálata és a gyermekkori traumák mértékével való összefüggések vizsgálata volt felnőttkori ADHD és BPD esetében. Vizsgáltuk továbbá a traumák és a személyiségműködés szintje közötti lehetséges mediáló szerepüket. Célunk volt továbbá a természet-kaland alapú sématerápia hatékonyságának tesztelése is, hogy betekintést nyerjünk az önkontroll problémák pszichoterápiás lehetőségeibe. Magyarországon korábban nem állt rendelkezésre megbízható, könnyen használható, egyben etikus, egyben validált kérdőív a gyermekkori traumatizáció mérésére, ezért elő lépésként validáltuk a gyermekkori trauma kérdőív rövid változatát (H-CTQ-SF).

Eredmények A H-CTQ-SF esetében kiváló pszichometriai tulajdonságokat tapasztaltunk, ennek köszönhetően fontos klinikai eszköz, amely nemcsak a kutatásban, hanem a pszichiátria és pszichoterápia gyakorlatában is alkalmazható. A gyermekkori traumák szintje az aADHD-s csoportban (komorbid BPD nélkül) szignifikánsan alacsonyabb volt a BPD-s csoporthoz képest, és nem különbözött az egészséges kontrollcsoporttól. Mindkét betegcsoport szignifikánsan különbözött a kontroll csoporttól minden egyes érzelemszabályozási és impulzivitás faktor esetében, de a profilok helyenként jelentősen eltértek. A gyermekkori traumatizáció mértéke szignifikáns direkt és indirekt hatást gyakorolt a felnőttkori személyiségműködésre a teljes mintán, de az érzelemszabályozás közvetítette elsősorban a személyiségre gyakorolt hatásokat.

Következtetések A gátlóprofil mintázatainak feltárása aADHD és BPD esetében segíthet a differenciáldiagnosztikában, és alapot nyújthat a pszichoterápiához. Ezért kezelése, farmako- ill. pszichoterápiával jelentős hatással lehet a személyiség működésére.

5. References

1.   Diagnostic and statistical manual of mental disorders. 5th text.rev. ed. American Psychiatric Association, 2022.

2.   Krause-Utz A, Erol E, Brousianou AV, Cackowski S, Paret C, Ende G, et al. Self-reported impulsivity in women with borderline personality disorder: the role of childhood maltreatment severity and emotion regulation difficulties. Borderline Personal Disord Emot Dysregul. 2019;6:6.

3.   Kenézlői E, Balogh L, Fazekas K, Bajzát B, Kruck E, Unoka Z, et al. Transdiagnostic study of impulsivity dimensions. Comparative analysis of impulsivity profiles in adult Attention Deficit Hyperactivity Disorder and Borderline Personality Disorder. Psychiatr Hung. 2020;35(2):136-45.

4.   Fayyad J, Sampson NA, Hwang I, Adamowski T, Aguilar-Gaxiola S, Al-Hamzawi A, et al. The descriptive epidemiology of DSM-IV Adult ADHD in the World Health Organization World Mental Health Surveys. Atten Defic Hyperact Disord. 2017;9(1):47-65.

5.   Simon V, Czobor P, Bálint S, Mészáros A, Bitter I. Prevalence and correlates of adult attention-deficit hyperactivity disorder: meta-analysis. Br J Psychiatry. 2009;194(3):204-11.

6.   Lara C, Fayyad J, de Graaf R, Kessler RC, Aguilar-Gaxiola S, Angermeyer M, et al. Childhood predictors of adult attention-deficit/hyperactivity disorder: results from the World Health Organization World Mental Health Survey Initiative. Biol Psychiatry. 2009;65(1):46-54.

7.   Scahill L, Schwab-Stone M. Epidemiology of ADHD in school-age children. Child Adolesc Psychiatr Clin N Am. 2000;9(3):541-55.

8.   Harris E. More Than 1 in 10 US Children Diagnosed With ADHD. JAMA. 2024;331(17):1440.

9.   Danielson ML, Claussen AH, Bitsko RH, Katz SM, Newsome K, Blumberg SJ, et al. ADHD Prevalence Among U.S. Children and Adolescents in 2022: Diagnosis, Severity, Co-Occurring Disorders, and Treatment. J Clin Child Adolesc Psychol. 2024:1-18.

10.   Faraone SV, Banaschewski T, Coghill D, Zheng Y, Biederman J, Bellgrove MA, et al. The World Federation of ADHD International Consensus Statement: 208 Evidence-based conclusions about the disorder. Neurosci Biobehav Rev. 2021;128:789-818.

11.   Bitter I, Simon V, Bálint S, Mészáros A, Czobor P. How do different diagnostic criteria, age and gender affect the prevalence of attention deficit hyperactivity disorder in adults? An epidemiological study in a Hungarian community sample. Eur Arch Psychiatry Clin Neurosci. 2010;260(4):287-96.

12.   Bonvicini C, Faraone SV, Scassellati C. Attention-deficit hyperactivity disorder in adults: a systematic review and meta-analysis of genetic, pharmacogenetic and biochemical studies. Mol Psychiatry. 2016;21(11):1643.

13.   New AS, Triebwasser J, Charney DS. The case for shifting borderline personality disorder to Axis I. Biol Psychiatry. 2008;64(8):653-9.

14.   Leichsenring F, Fonagy P, Heim N, Kernberg OF, Leweke F, Luyten P, et al. Borderline personality disorder: a comprehensive review of diagnosis and clinical presentation, etiology, treatment, and current controversies. World Psychiatry. 2024;23(1):4-25.

15.   Oldham JM. Borderline personality disorder and suicidality. Am J Psychiatry. 2006;163(1):20-6.

16.   Pennay A, Cameron J, Reichert T, Strickland H, Lee NK, Hall K, et al. A systematic review of interventions for co-occurring substance use disorder and borderline personality disorder. J Subst Abuse Treat. 2011;41(4):363-73.

17.   Grant BF, Chou SP, Goldstein RB, Huang B, Stinson FS, Saha TD, et al. Prevalence, correlates, disability, and comorbidity of DSM-IV borderline personality disorder: results from the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions. J Clin Psychiatry. 2008;69(4):533-45.

18.   American Psychiatric Association. Diagnostic and statistical manual of mental disorders. Washington DC; 2013.

19.   Zanarini MC, Frankenburg FR, Hennen J, Reich DB, Silk KR. Prediction of the 10-year course of borderline personality disorder. Am J Psychiatry. 2006;163(5):827-32.

20.   Zanarini MC, Frankenburg FR, Vujanovic AA, Hennen J, Reich DB, Silk KR. Axis II comorbidity of borderline personality disorder: description of 6-year course and prediction to time-to-remission. Acta Psychiatr Scand. 2004;110(6):416-20.

21.   Sansone RA, Sansone LA. Borderline personality and criminality. Psychiatry (Edgmont). 2009;6(10):16-20.

22.   Asherson P, Young AH, Eich-Höchli D, Moran P, Porsdal V, Deberdt W. Differential diagnosis, comorbidity, and treatment of attention-deficit/hyperactivity disorder in relation to bipolar disorder or borderline personality disorder in adults. Curr Med Res Opin. 2014;30(8):1657-72.

23.   Ferrer M, Andión O, Matalí J, Valero S, Navarro JA, Ramos-Quiroga JA, et al. Comorbid attention-deficit/hyperactivity disorder in borderline patients defines an impulsive subtype of borderline personality disorder. J Pers Disord. 2010;24(6):812-22.

24.   Turner D, Laier C, Brand M, Bockshammer T, Welsch R, Rettenberger M. Response inhibition and impulsive decision-making in sexual offenders against children. J Abnorm Psychol. 2018;127(5):471-81.

25.   Distel MA, Carlier A, Middeldorp CM, Derom CA, Lubke GH, Boomsma DI. Borderline personality traits and adult attention-deficit hyperactivity disorder symptoms: a genetic analysis of comorbidity. Am J Med Genet B Neuropsychiatr Genet. 2011;156B(7):817-25.

26.   Lampe K, Konrad K, Kroener S, Fast K, Kunert HJ, Herpertz SC. Neuropsychological and behavioural disinhibition in adult ADHD compared to borderline personality disorder. Psychol Med. 2007;37(12):1717-29.

27.   Cavelti M, Corbisiero S, Bitto H, Moerstedt B, Newark P, Faschina S, et al. A Comparison of Self-Reported Emotional Regulation Skills in Adults With Attention-Deficit/Hyperactivity Disorder and Borderline Personality Disorder. J Atten Disord. 2019 Oct;23(12):1396-1406.

28.   Witt O, Brücher K, Biegel G, Petermann F, Schmidt S. Adult ADHD versus borderline personality disorder: criteria for differential diagnosis]. Fortschr Neurol Psychiatr. 2014;82(6):337-45.

29.   Philipsen A, Feige B, Hesslinger B, Scheel C, Ebert D, Matthies S, et al. Borderline typical symptoms in adult patients with attention deficit/hyperactivity disorder. Atten Defic Hyperact Disord. 2009;1(1):11-8.

30.   Berking M, Wupperman P, Reichardt A, Pejic T, Dippel A, Znoj H. Emotion-regulation skills as a treatment target in psychotherapy. Behav Res Ther. 2008;46(11):1230-7.

31. Rüfenacht E, Euler S, Prada P, Nicastro R, Dieben K, Hasler R, et al. Emotion dysregulation in adults suffering from attention deficit hyperactivity disorder (ADHD), a comparison with borderline personality disorder (BPD). Borderline Personal Disord Emot Dysregul. 2019;6:11.

32. Ditrich I, Philipsen A, Matthies S. Borderline personality disorder (BPD) and attention deficit hyperactivity disorder (ADHD) revisited - a review-update on common grounds and subtle distinctions. Borderline Personal Disord Emot Dysregul. 2021;8(1):22.

33. Dubois M, Hauser TU. Value-free random exploration is linked to impulsivity. Nat Commun. 2022;13(1):4542.

34. MacKillop J, Weafer J, C Gray J, Oshri A, Palmer A, de Wit H. The latent structure of impulsivity: impulsive choice, impulsive action, and impulsive personality traits. Psychopharmacology (Berl). 2016;233(18):3361-70.

35. Linhartová P, Širůček J, Ejova A, Barteček R, Theiner P, Kašpárek T. Dimensions of Impulsivity in Healthy People, Patients with Borderline Personality Disorder, and Patients with Attention-Deficit/Hyperactivity Disorder. J Atten Disord. 2021 Feb;25(4):584-595.

36. Richard-Lepouriel H, Kung AL, Hasler R, Bellivier F, Prada P, Gard S, et al. Impulsivity and its association with childhood trauma experiences across bipolar disorder, attention deficit hyperactivity disorder and borderline personality disorder. J Affect Disord. 2019;244:33-41.

37. Linhartová P, Látalová A, Barteček R, Širůček J, Theiner P, Ejova A, et al. Impulsivity in patients with borderline personality disorder: a comprehensive profile compared with healthy people and patients with ADHD. Psychol Med. 2020;50(11):1829-38.

38. McClure G, Hawes DJ, Dadds MR. Borderline personality disorder and neuropsychological measures of executive function: A systematic review. Personal Ment Health. 2016;10(1):43-57.

39. Krause-Utz A, Cackowski S, Daffner S, Sobanski E, Plichta MM, Bohus M, et al. Delay discounting and response disinhibition under acute experimental stress in women with borderline personality disorder and adult attention deficit hyperactivity disorder. Psychol Med. 2016;46(15):3137-49.

40.   Cackowski S, Reitz AC, Ende G, Kleindienst N, Bohus M, Schmahl C, et al. Impact of stress on different components of impulsivity in borderline personality disorder. Psychol Med. 2014;44(15):3329-40.

41.   Barker V, Romaniuk L, Cardinal RN, Pope M, Nicol K, Hall J. Impulsivity in borderline personality disorder. Psychol Med. 2015;45(9):1955-64.

42.   Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. Am J Prev Med. 1998;14(4):245-58.

43.   McCauley J, Kern DE, Kolodner K, Dill L, Schroeder AF, DeChant HK, et al. Clinical characteristics of women with a history of childhood abuse: unhealed wounds. JAMA. 1997;277(17):1362-8.

44.   Nelson J, Klumparendt A, Doebler P, Ehring T. Childhood maltreatment and characteristics of adult depression: meta-analysis. Br J Psychiatry. 2017;210(2):96-104.

45.   Saleh A, Potter GG, McQuoid DR, Boyd B, Turner R, MacFall JR, et al. Effects of early life stress on depression, cognitive performance and brain morphology. Psychol Med. 2017;47(1):171-81.

46.   Taillieu TL, Brownridge DA, Sareen J, Afifi TO. Childhood emotional maltreatment and mental disorders: Results from a nationally representative adult sample from the United States. Child Abuse Negl. 2016;59:1-12.

47.   Hovens JG, Giltay EJ, Spinhoven P, van Hemert AM, Penninx BW. Impact of childhood life events and childhood trauma on the onset and recurrence of depressive and anxiety disorders. J Clin Psychiatry. 2015;76(7):931-8.

48.   Springer KW, Sheridan J, Kuo D, Carnes M. Long-term physical and mental health consequences of childhood physical abuse: results from a large population-based sample of men and women. Child Abuse Negl. 2007;31(5):517-30.

49.   Zhang S, Lin X, Liu J, Pan Y, Zeng X, Chen F, et al. Prevalence of childhood trauma measured by the short form of the Childhood Trauma Questionnaire in people with substance use disorder: A meta-analysis. Psychiatry Res. 2020 Dec:294:113524.

50.   Widom CS, White HR, Czaja SJ, Marmorstein NR. Long-term effects of child abuse and neglect on alcohol use and excessive drinking in middle adulthood. J Stud Alcohol Drugs. 2007;68(3):317-26.

51.   Read J, van Os J, Morrison AP, Ross CA. Childhood trauma, psychosis and schizophrenia: a literature review with theoretical and clinical implications. Acta Psychiatr Scand. 2005;112(5):330-50.

52.   Liu ZZ, Chen H, Bo QG, Chen RH, Li FW, Lv L, et al. Psychological and behavioral characteristics of suicide attempts and non-suicidal self-injury in Chinese adolescents. J Affect Disord. 2018;226:287-93.

53.   Stansfeld SA, Clark C, Smuk M, Power C, Davidson T, Rodgers B. Childhood adversity and midlife suicidal ideation. Psychol Med. 2017;47(2):327-40.

54.   Bruffaerts R, Demyttenaere K, Borges G, Haro JM, Chiu WT, Hwang I, et al. Childhood adversities as risk factors for onset and persistence of suicidal behaviour. Br J Psychiatry. 2010;197(1):20-7.

55.   Heim C, Newport DJ, Mletzko T, Miller AH, Nemeroff CB. The link between childhood trauma and depression: insights from HPA axis studies in humans. Psychoneuroendocrinology. 2008;33(6):693-710.

56.   Danese A, J Lewis S. Psychoneuroimmunology of Early-Life Stress: The Hidden Wounds of Childhood Trauma? Neuropsychopharmacology. 2017;42(1):99-114.

57.   McLaughlin KA, Sheridan MA, Lambert HK. Childhood adversity and neural development: deprivation and threat as distinct dimensions of early experience. Neurosci Biobehav Rev. 2014;47:578-91.

58.   Morey LC. Development and initial evaluation of a self-report form of the DSM-5 Level of Personality Functioning Scale. Psychol Assess. 2017;29(10):1302-8.

59.   Krueger RF, Derringer J, Markon KE, Watson D, Skodol AE. Initial construction of a maladaptive personality trait model and inventory for DSM-5. Psychol Med. 2012;42(9):1879-90.

60.   S Nagy Z, Salgó E, Bajzát B, Hajduska-Dér B, Unoka ZS. Reliability and validity of the Hungarian version of the Personality Inventory for DSM-5 (PID-5). PLoS One. 2022;17(7):e0266201.

61.   Racine N, Killam T, Madigan S. Trauma-Informed Care as a Universal Precaution: Beyond the Adverse Childhood Experiences Questionnaire. JAMA Pediatr. 2020;174(1):5-6.

62.   Lippard ETC, Nemeroff CB. The Devastating Clinical Consequences of Child Abuse and Neglect: Increased Disease Vulnerability and Poor Treatment Response in Mood Disorders. Am J Psychiatry. 2020;177(1):20-36.

63.   Bernstein DP, Fink L, Handelsman L, Foote J, Lovejoy M, Wenzel K, et al. Initial reliability and validity of a new retrospective measure of child abuse and neglect. Am J Psychiatry. 1994;151(8):1132-6.

64.   David B. Childhood Trauma Questionnaire: A retrospective self-report manual. In: Fink L, editor. San Antonio: TX: The Psychological Corporation; 1998.

65.   Bernstein DP, Stein JA, Newcomb MD, Walker E, Pogge D, Ahluvalia T, et al. Development and validation of a brief screening version of the Childhood Trauma Questionnaire. Child Abuse Negl. 2003;27(2):169-90.

66.   Scher CD, Stein MB, Asmundson GJ, McCreary DR, Forde DR. The childhood trauma questionnaire in a community sample: psychometric properties and normative data. J Trauma Stress. 2001;14(4):843-57.

67.   Kenézlői E, Csernela E, Nemoda Z, Lakatos K, Czéh B, Unoka ZS, et al. Psychometric properties of the Hungarian childhood trauma questionnaire short form and its validity in patients with adult attention-deficit hyperactivity disorder or borderline personality disorder. Borderline Personal Disord Emot Dysregul. 2023;10(1):33.

68.   Young JE, Kosko JS, Weishaar ME. Schema Therapy. A Practitioner's Guide. New York: Guilford Press; 2003. p. 436.

69.   Gass MA. Adventure Therapy: Theory, Research, and Practice. In: Gillis HL, editor. 2nd ed. New York: Routledge; 2020. p. 484.

70.   Kenézlői E. Comparative Efficacy Analysis of Nature-Adventure Therapy Based Schema Therapy (N-ABST) and classic Schema Therapy (ST). Open Science Foundation. [accessed: 13 Nov 2023]

71.   Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, et al. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. J Clin Psychiatry. 1998;59 Suppl 20:22-33;quiz 4-57.

72.   Balázs, J. A M.I.N.I. és a M.I.N.I. PLUSZ kérdőív magyar nyelvű változatának kidolgozása és alkalmazása a gyakorlatban. Budapest ,2002.

73.   First M, Williams J, Benjamin L, Spitzer R. The Structured Clinical Interview for DSM 5 Personality Disorders.: American Psychiatric Association; 2016.

74.   Derogatis LR, Rickels K, Rock AF. The SCL-90 and the MMPI: a step in the validation of a new self-report scale. Br J Psychiatry. 1976;128:280-9.

75.   Conners C, Pitkanen J, Rzepa S. Conners' 3rd Edition (Conners 3; Conners 2008). Kreutzer J, J D, Caplan B, editors. New York: Springer 2011. 675–8 p.

76.   Cronbach LJ, Warrington WG. Time-limit tests: estimating their reliability and degree of speeding. Psychometrika. 1951;16(2):167-88.

77.   Kongerslev MT, Bach B, Rossi G, Trauelsen AM, Ladegaard N, Løkkegaard SS, et al. Psychometric validation of the Childhood Trauma Questionnaire-Short Form (CTQ-SF) in a Danish clinical sample. Child Abuse Negl. 2019;94:104026.

78.   Sacchi C, Vieno A, Simonelli A. Italian validation of the Childhood Trauma Questionnaire-Short Form on a college group. Psychol Trauma. 2018;10(5):563-71.

79.   Grassi-Oliveira R, Cogo-Moreira H, Salum GA, Brietzke E, Viola TW, Manfro GG, et al. Childhood Trauma Questionnaire (CTQ) in Brazilian samples of different age groups: findings from confirmatory factor analysis. PLoS One. 2014;9(1):e87118.

80.   Karos K, Niederstrasser N, Abidi L, Bernstein DP, Bader K. Factor structure, reliability, and known groups validity of the German version of the Childhood Trauma Questionnaire (Short-form) in Swiss patients and nonpatients. J Child Sex Abus. 2014;23(4):418-30.

81.   Kim D, Park SC, Yang H, Oh DH. Reliability and validity of the korean version of the childhood trauma questionnaire-short form for psychiatric outpatients. Psychiatry Investig. 2011;8(4):305-11.

82.   Wingenfeld K, Spitzer C, Mensebach C, Grabe HJ, Hill A, Gast U, et al. The German version of the Childhood Trauma Questionnaire (CTQ): preliminary psychometric properties. Psychother Psychosom Med Psychol. 2010;60(11):442-50.

83.   Thombs BD, Bernstein DP, Lobbestael J, Arntz A. A validation study of the Dutch Childhood Trauma Questionnaire-Short Form: factor structure, reliability, and known-groups validity. Child Abuse Negl. 2009;33(8):518-23.

84.   Chen F, Curran PJ, Bollen KA, Kirby J, Paxton P. An Empirical Evaluation of the Use of Fixed Cutoff Points in RMSEA Test Statistic in Structural Equation Models. Sociol Methods Res. 2008;36(4):462-94.

85.   Bach B, Fjeldsted R. The role of DSM-5 borderline personality symptomatology and traits in the link between childhood trauma and suicidal risk in psychiatric patients. Borderline Personal Disord Emot Dysregul. 2017;4:12.

86.   Bach B, Bo S, Simonsen E. Maladaptive personality traits may link childhood trauma history to current internalizing symptoms. Scand J Psychol. 2022;63(5):468-75.

87.   Bevilacqua L, Carli V, Sarchiapone M, George DK, Goldman D, Roy A, et al. Interaction between FKBP5 and childhood trauma and risk of aggressive behavior. Arch Gen Psychiatry. 2012;69(1):62-70.

88.   David B. Childhood Trauma Questionnaire: A retrospective self-report manual. In: Fink L, editor. San Antonio: TX: The Psychological Corporation; 1998.

89.   Horn JL, Engstrom R. Cattell's Scree Test In Relation To Bartlett's Chi-Square Test And Other Observations On The Number Of Factors Problem. Multivariate Behav Res. 1979;14(3):283-300.

90.   Longman RS, Cota AA, Holden RR, Fekken GC. A Regression Equation for the Parallel Analysis Criterion in Principal Components Analysis: Mean and 95th Percentile Eigenvalues. Multivariate Behav Res. 1989;24(1):59-69.

91.   He J, Zhong X, Gao Y, Xiong G, Yao S. Psychometric properties of the Chinese version of the Childhood Trauma Questionnaire-Short Form (CTQ-SF) among undergraduates and depressive patients. Child Abuse Negl. 2019;91:102-8.

92.   Hernandez A, Gallardo-Pujol D, Pereda N, Arntz A, Bernstein DP, Gaviria AM, et al. Initial validation of the Spanish childhood trauma questionnaire-short form: factor structure, reliability and association with parenting. J Interpers Violence. 2013;28(7):1498-518.

93.   Gerdner A, Allgulander C. Psychometric properties of the Swedish version of the Childhood Trauma Questionnaire-Short Form (CTQ-SF). Nord J Psychiatry. 2009;63(2):160-70.

94.   Rüfenacht E, Pham E, Nicastro R, Dieben K, Hasler R, Weibel S, et al. Link between History of Childhood Maltreatment and Emotion Dysregulation in Adults Suffering from Attention Deficit/Hyperactivity Disorder or Borderline Personality Disorder. Biomedicines. 2021;9(10).

95.   Calvo N, Lara B, Serrat L, Pérez-Rodríguez V, Andión Ò, Ramos-Quiroga JA, et al. The role of environmental influences in the complex relationship between borderline

personality disorder and attention-deficit/hyperactivity disorder: review of recent findings. Borderline Personal Disord Emot Dysregul. 2020;7:2.

96. Bohus M, Kleindienst N, Limberger MF, Stieglitz RD, Domsalla M, Chapman AL, et al. The short version of the Borderline Symptom List (BSL-23): development and initial data on psychometric properties. Psychopathology. 2009;42(1):32-9.

97. Kenézlői E, Balogh L, Somogyi S, Lévay EE, Halmai Z, Nemoda Z, et al. Emotion dysregulation and impulsivity as overlapping symptoms in adult Attention-Deficit/Hyperactivity Disorder and Borderline Personality Disorder: severity profiles and associations with childhood traumatization and personality functioning. Ann Gen Psychiatry. 2025;24(1):3.

98. Gratz K, Roemer L. Multidimensional assessment of emotion regulation and dysregulation: development, factor structure, and initial validation of the difficulties in emotion regulation scale. J Psychopathol Behav Assess. 2004; 26 (1):41-54.

99. Patton JH, Stanford MS, Barratt ES. Factor structure of the Barratt impulsiveness scale. J Clin Psychol. 1995;51(6):768-74.

100. Reise SP, Moore TM, Sabb FW, Brown AK, London ED. The Barratt Impulsiveness Scale-11: reassessment of its structure in a community sample. Psychol Assess. 2013;25(2):631-42.

101. Winstanley CA, Eagle DM, Robbins TW. Behavioral models of impulsivity in relation to ADHD: translation between clinical and preclinical studies. Clin Psychol Rev. 2006;26(4):379-95.

102. Cambridge Cognition Ltd, https://cambridgecognition.com/; 2023 [accessed 12 Apr 2023]

103. Rogers RD, Everitt BJ, Baldacchino A, Blackshaw AJ, Swainson R, Wynne K, et al. Dissociable deficits in the decision-making cognition of chronic amphetamine abusers, opiate abusers, patients with focal damage to prefrontal cortex, and tryptophan-depleted normal volunteers: evidence for monoaminergic mechanisms. Neuropsychopharmacology. 1999;20(4):322-39.

104. Bajzát B, Soltész P, Soltész-Várhelyi K, Lévay EE, Unoka ZS. Impaired decision-making in borderline personality disorder. Front Psychol. 2023;14:1109238.

105. IBM C. IBM SPSS Statistics [Computer software] Version 28.0. Armonk (NY)2021.

106.   JASP T. JASP [Computer software] Version 0.19.0. 2024.

107.   Network TNCT. Is It ADHD or Childhood Traumatic Stress?- A guide for clinicians 2016 [Available from: https://www.nctsn.org/sites/default/files/resources/is_it_adhd_or_child_traumatic_stress.pdf]

108.   Dalley JW, Robbins TW. Fractionating impulsivity: neuropsychiatric implications. Nat Rev Neurosci. 2017;18(3):158-71.

109.   Hauschildt M, Peters MJ, Moritz S, Jelinek L. Heart rate variability in response to affective scenes in posttraumatic stress disorder. Biol Psychol. 2011;88(2-3):215-22.

110.   Frewen PA, Lanius RA. Toward a psychobiology of posttraumatic self-dysregulation: reexperiencing, hyperarousal, dissociation, and emotional numbing. Ann N Y Acad Sci. 2006;1071:110-24.

111.   Elton A, Tripathi SP, Mletzko T, Young J, Cisler JM, James GA, et al. Childhood maltreatment is associated with a sex-dependent functional reorganization of a brain inhibitory control network. Hum Brain Mapp. 2014;35(4):1654-67.

112.   Battle CL, Shea MT, Johnson DM, Yen S, Zlotnick C, Zanarini MC, et al. Childhood maltreatment associated with adult personality disorders: findings from the Collaborative Longitudinal Personality Disorders Study. J Pers Disord. 2004;18(2):193-211.

113.   Hovens JG, Giltay EJ, van Hemert AM, Penninx BW. Childhood meltreatment and the course of depressive and anxiety disorders: the contribution of personality characteristics. Depress Anxiety. 2016;33(1):27-34.

114.   Luo Q, Zhang L, Huang CC, Zheng Y, Kanen JW, Zhao Q, et al. Association between childhood trauma and risk for obesity: a putative neurocognitive developmental pathway. BMC Med. 2020;18(1):278.

115.   Young JE, Kosko JS, Weishaar ME. Schema Therapy A Practitioner's Guide. New York: Guilford Press; 2003. p. 436.

6. List of own publications

Publications related to the thesis

1. Kenézlői E, Balogh L, Somogyi S, Lévay EE, Halmai Z, Nemoda Z, et al. Emotion dysregulation and impulsivity as overlapping symptoms in adult attention-deficit/hyperactivity disorder and borderline personality disorder: severity profiles and associations with childhood traumatization and personality functioning. Ann Gen Psychiatry. 2025;24(1):3. DOI: 10.1186/s12991-024-00540-y. IF:3.6

2. Kenézlői E, Csernela E, Nemoda Z, Lakatos K, Czéh B, Unoka ZS, et al. Psychometric properties of the Hungarian childhood trauma questionnaire short form and its validity in patients with adult attention-deficit hyperactivity disorder or borderline personality disorder. Borderline Personal Disord Emot Dysregul. 2023;10(1):33. DOI: 10.1186/s40479-023-00239-8. IF:4

3. Kenézlői E, Balogh L, Fazekas K, Bajzát B, Kruck E, Unoka Z, et al. Transdiagnostic study of impulsivity dimensions. Comparative analysis of impulsivity profiles in adult Attention Deficit Hyperactivity Disorder and Borderline Personality Disorder. Psychiatr Hung. 2020;35(2):136-45.

Publications independent of the thesis

4. Nagy P, Bognár E, Farkas L, Kenézlői E, Vida P, Gádoros J, Tárnok Z. Tourette-szindrómás gyerekek klinikai jellemzői. Psychiatr Hung. 2020;35(1):37–45.

5. Réthelyi J, Kenézlői E. Pszichiátriai betegségek a művészetekben. In: Réthelyi J, editor. Pszichiátria jegyzet orvostanhallgatóknak. Budapest, Magyarország: Oriold és Társai Kiadó; 2020. p. 340-352.

6. Rákár-Szabó N, Kenézlői E. A tapasztalati tanulástól a kalandterápiáig. Az 'Adventure Therapy' eredete, fogalmi keretei, és alkalmazásának pszichoterápiás alapja. Serdülő- és Gyermek-pszichoterápia. 2019;12(1):67-92.

7. Kenezloi E, Lakatos K, Horvath EZ, Sasvari-Szekely M, Nemoda Z. A pilot study of early onset obsessive-compulsive disorder: Symptom dimensions and association analysis with polymorphisms of the serotonin transporter gene. Psychiatry Res. 2018;268:388–91.

8. Kenézlői E, Valkó L, Zalka Z. Játsszunk szenvedéllyel: Az önfeledt gyermek és a tudatos felnőtt jelenléte játékhelyzetben. Lélekelemzés. 2015;10(1):91-109.

9. Keszler G, Kruk E, Kenezloi E, Tarnok Z, Sasvari-Szekely M, Nemoda Z. Association of the tumor necrosis factor -308 A/G promoter polymorphism with Tourette syndrome. Int J Immunogenet. 2014;41(6):493-498. IF: 1.247

10. Kenézlői E, Nemoda Z. Örökletes tényezők a kényszeres zavar hátterében: genetikai vizsgálatok összefoglalása. Psychiatria Hungarica. 2010;25(5):378-393.

11. Tárnok Z. Tic-taktika: a Tourette-szindrómáról. Terápiás lehetőségek Tourette-szindrómában. Budapest: Akadémiai Kiadó; 2009. (book chapter)

12. Tárnok Z. Tic-taktika: a Tourette-szindrómáról. Tourette-klub a Vadaskert Kórházban. Budapest: Akadémiai Kiadó; 2009. (book chapter)

7. Acknowledgements

8. Appendix

Gyermekkori trauma kérdőív[1]

(Bernstein & Fink 1998, magyar változat: Kenézlői és mtsai. 2023)

Milyen gyakran fordult elő gyerekkoromban (=18 éves korom előtt), hogy...

			soha	ritkán	időnként	gyakran	nagyon gyakran
PN	1.	Nem kaptam eleget enni.					
PNR	2.	Tudtam, hogy van valaki, aki gondoskodik rólam és megvéd engem.					
EA	3.	Családtagjaim olyan szavakkal illettek, mint „hülye", „lusta" vagy „csúnya".					
PN	4.	A szüleim olyan ittasak voltak (vagy drog hatása alatt álltak), hogy nem tudtak gondoskodni a családról.					
ENR	5.	Volt olyan személy a családunkban, aki segített abban, hogy fontosnak és különlegesnek érezzem magam.					
PN	6.	Piszkos ruhában kellett járnom.					
ENR	7.	Éreztem, hogy szeretnek.					
EA	8.	Úgy éreztem, hogy szüleim azt kívánták, jobb lett volna, ha meg sem születek.					
PA	9.	Valamelyik családtagom úgy megvert, hogy orvoshoz kellett vinni vagy kórházba kerültem.					
M/D	10.	Semmit nem akartam volna megváltoztatni a családomban.					
PA	11.	A családtagjaim közül valaki annyira megütött, hogy foltok, horzsolások vagy látható nyomok maradtak utána.					
PA	12.	Szíjjal, pálcával, kötéllel vagy más, kemény tárggyal vertek.					
ENR	13.	A családunkban odafigyeltek egymásra az emberek.					
EA	14.	Családtagjaim sértő vagy bántó dolgokat mondtak nekem.					

PA	15.	Úgy gondolom, hogy engem testileg bántalmaztak.				
M/D	16.	Tökéletes gyerekkorom volt.				
PA	17.	Olyan súlyosan megütöttek vagy megvertek, hogy azt észrevette a tanárom, szomszédunk vagy egy orvos.				
EA	18.	Úgy éreztem, hogy valaki a családból gyűlöl engem.				
ENR	19.	A családunkban közel érezték magukat egymáshoz az emberek.				
SA	20.	Volt, aki megpróbált szexuálisan fogdosni; vagy megpróbált rávenni arra, hogy én fogdossam őt szexuális céllal.				
SA	21.	Valaki megfenyegetett, hogy bántani fog vagy hazugságokat terjeszt rólam, hogyha nem vagyok hajlandó szexuális tevékenységre.				
M/D	22.	A családunk a világ legjobb családja volt.				
SA	23.	Megpróbáltak rávenni szexuális tevékenységre vagy szexuális tartalmú dolgok nézésére.				
SA	24.	Volt, hogy szexuálisan molesztáltak.				
EA	25.	Azt hiszem, hogy engem érzelmileg bántalmaztak.				
PNR	26.	Volt, aki orvoshoz vigyen, ha szükségem volt rá.				
SA	27.	Azt hiszem, engem szexuálisan zaklattak / bántalmaztak.				
ENR	28.	A családom támasz és erő forrása volt számomra.				

[1] H – CTQ – SF – Childhood Trauma Questionnaire – short form, Hungarian version