Research Article

A trauma-spectrum approach: quantifying a dimensional model of trauma-related and dissociative disorders

Marleen Wildschut[1]*, Sanne Swart[1], Willemien Langeland[2], Jan H. Smit[2], and Nel Draijer[2]

[1]*GGZ Friesland, Leeuwarden, The Netherlands*
[2]*Department of Psychiatry, VU University Medical Center, Amsterdam, The Netherlands*

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Abstract

Aim: The aim of this paper is to test the validity of the trauma axis of a dimensional model for diagnosis and treatment indication of trauma-related and dissociative disorders. The central question is: is the (trans-diagnostic) continuum of trauma-related and dissociative disorders related to the severity in reported traumatization: a dose-response relationship?

A sample of one hundred and fifty consecutive patients, indicated for treatment in either a trauma-related disorders or a personality disorders treatment program, was systematically assessed on trauma-related disorders, dissociative disorders, and childhood trauma, using structured interviews. We constructed a 'trauma-diagnosis severity score' by classifying patients according to their most severe disorder (ranging from none, (chronic) posttraumatic stress disorder (PTSD), complex PTSD to dissociative disorder not otherwise specified, and finally dissociative identity disorder, in ascending order). The observed correlation (rs = .54) between reported trauma severity and this trauma-diagnosis severity score indicates that retrospectively reported trauma severity in child- and adulthood is strongly associated with more severe pathology.

Trauma-related and dissociative disorders may be considered as forming a continuum, ranging from less to more extreme severity. The findings support the significance of the trauma-axis of the proposed dimensional model.

INTRODUCTION

The primary aim of this study is to investigate whether a dimension of trauma-related and dissociative disorders is related to differences in the severity of retrospectively reported traumatic experiences in child- and adulthood in such a way that more severe trauma is linked to more severe disorders. This dimension constitutes the trauma axis of the two-dimensional model for diagnosis and treatment indication of trauma-related and dissociative disorders [1].

Draijer [1] proposed a theoretical model (Figure 1) [2] in which there is a presumed relationship between a dimension of trauma-related and dissociative disorders on the one hand and the severity of the trauma endured on the other. This severity varies depending on factors such as the age at which the trauma occurred, whether it was physically intrusive, how much force was used, how frequently it occurred, the relationship to (and dependency from) the perpetrator, and the number of perpetrators [2,3]. The spectrum of adaptations to trauma includes a range of severity, comprising relatively mild and nonclinical symptoms through to relatively severe mental disorders, which also has implications for treatment indication and staging of treatment.

Prospective and retrospective studies consistently show an association between childhood trauma and posttraumatic stress disorder (PTSD) in adulthood [4-8]. Exposure to severe childhood trauma, especially interpersonal, cumulative and at an early age affects the severity and complexity of posttraumatic stress symptoms in adulthood [9-13].

Van der Kolk and colleagues [14] stated that the severity and complexity of post traumatic stress symptoms in adulthood were not captured in the DSM-IV framework of PTSD. The authors concluded that PTSD, dissociation, somatization, and affect dysregulation represent a spectrum of adaptations to trauma [14]. Besides (chronic) PTSD, different disorders - Complex PTSD (CPTSD), Other Specified Dissociative Disorder (DDNOS), and Dissociative Identity Disorder (DID) – are often associated with trauma, vary in the severity of PTSD-symptoms, affect dysregulation, and dissociative symptoms, and have different scientific histories as we will discuss below.

In the nineties, several trauma researchers collaborated on the DSM-IV PTSD Field Trials to examine a group of symptoms not addressed by the PTSD diagnosis and perceived in survivors of prolonged and repeated trauma [15], and named it Complex PTSD [11]. In addition to the PTSD symptoms, this constellation of symptoms consists of affect dysregulation, and disturbances

Figure 1 Diagnostic model for the spectrum of trauma-related disorders [2].
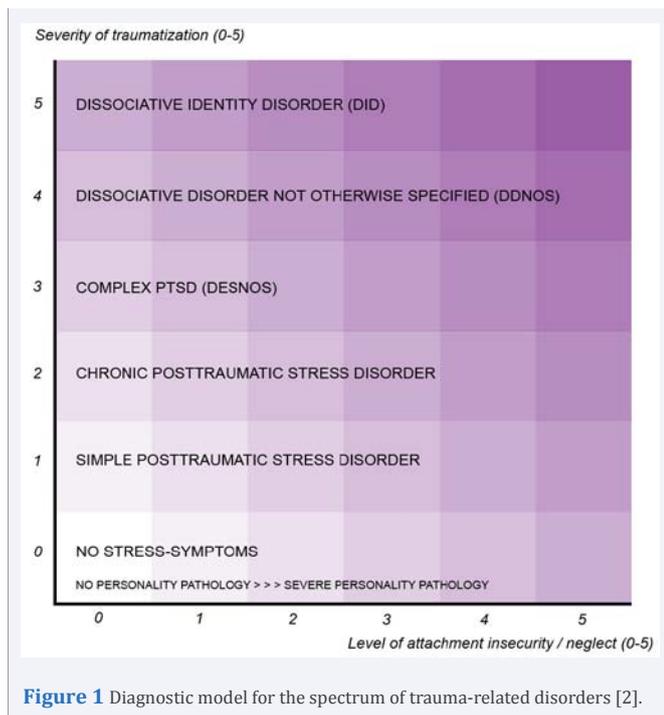
in self-concept and interpersonal functioning [11]. Finally, these symptoms were incorporated in the DSM-IV under 'associated features of PTSD' [16].

Resick and colleagues [17] evaluated the CPTSD literature considering DSM-5 [18]. They concluded that unless and until complex traumas are shown to have qualitatively different effects, the working hypothesis that complex post traumatic symptomatology falls on a continuum seems plausible. While CPTSD is not added to DSM-5 [19], the 11th edition of the International Classification of Diseases (ICD-11) may include CPTSD.

Although CPTSD is not included in DSM-5 as a separate diagnostic entity, Knefel and colleagues [20] found that PTSD and CPTSD symptoms were strongly interconnected within disorders and to a lesser degree between disorders and that dissociation could be a key factor in both PTSD and CPTSD. Furthermore, Thomaes and colleagues [21] found that neural correlates of CPTSD are more severe than those of classic PTSD.

Reports of (very) early childhood trauma have often been related to the occurrence of dissociative disorders, resulting in the most severe and chronic psychopathology in the spectrum of trauma-related disorders [3,22-26], although there are also doubts about this relation [27]. Still, Chalavi and colleagues [28] found that compared to PTSD-only patients, DID patients (with comorbid PTSD) showed additional structural differences in brain structures, including smaller hippocampal and larger pallidum volumes relative to healthy controls, suggesting that DID is an even more severe trauma-related disorder than PTSD.

The trauma-related and dissociative disorder spectrum approach joins together conditions that were previously considered to exist separately. The question of whether mental disorders are discrete clinical conditions or arbitrary distinctions

along dimensions of functioning is a long-standing issue [29]. However, in this case of trauma-related and dissociative disorders an attempt is made to improve treatment indication, by the assumption that these disorders are on an underlying dimension of increased severity in symptoms, implying differences in treatment methods. Work in the area of a posttraumatic stress spectrum has sought to go beyond DSM category and to consider in more detail a spectrum of in severity varying syndromes rather than just presence or absence for diagnostic purposes, as well as a spectrum in terms of the nature and severity of the stressors. However, previous research in this area has been limited by design problems. Earlier studies relied mostly on survey data rather than clinical interviews and used only female participants [9-10]. Merckelbach and colleauges [30] showed that symptom over reporting in surveys has a psychometric impact that may obscure relationships between clinically relevant variables and should preferably be monitored. Also, earlier studies did not focus on the dissociative disorders [10,13].

Regarding the nature and severity of the stressor(s), during the last decades several instruments for the retrospective assessment of childhood trauma in adults have been developed, including self-report questionnaires and semi-structured interviews. For example, the Adverse Childhood Experiences Study questionnaire [31], the Childhood Trauma Questionnaire [32], the Traumatic Antecedents Interview [33] and the Structured Trauma Interview [34]. For an overview see Roy & Perry [35]. Most of these instruments [31,33] use the sum of the trauma categories reported in order to quantify the level of exposure to trauma in childhood. Generally, most patients report more than one category of childhood adversity, suggesting that researchers trying to understand the long-term psychological implications of childhood abuse may benefit from considering a wide range of related adverse childhood exposures [31].

Several meta-analyses show an association between the severity of (retrospectively reported) trauma and the presence of trauma-related disorders [4,6]. Though Paolucci and colleagues [8] found clear evidence confirming a link between child sexual abuse (CSA) and subsequent negative short- and long-term effects on development, amongst other variables, type of abuse, age when abused, relationship to perpetrator, and number of incidents of abuse was not found to mediate the effect of CSA on these outcomes. Another meta-analysis found a higher risk of PTSD by reports of penetrative CSA than with reports of non-penetrative or non-contact abuse [4]. In addition, a third meta-analysis also indicated that penetration strengthened the association between sexual abuse and a lifetime diagnosis of PTSD [6]. The association persisted regardless of sex of the abuse survivor or age at which the abuse occurred. However, all these meta-analyses were restricted to CSA, making it difficult to draw conclusions about the effects of other types of trauma.

Summarizing, one may hypothesize the following: different trauma-related and dissociative disorders interrelate in the sense that they form a continuum of increasing severity and this severity is assumed to be related to the severity of retrospectively assessed traumatic experiences. The primary aim of this study is to extend previous research in this area by including PTSD, CPTSD, and dissociative disorders in relation to traumatic experiences

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and to investigate whether such a dose-response relationship exists. To study these relationships, we extensively interviewed a sample consisting of patients indicated for treatment in a trauma-related or personality disorders treatment program in a specialized mental health care setting. This study is part of a larger project [2] aimed at testing the two-dimensional model of trauma-related disorders [1].

MATERIALS AND METHODS

Participants

The sample (*n* = 150) consisted of patients in psychiatric care in the Dutch province of Friesland where care is divided into diagnostic-driven treatment programs. We collected data from consecutively referred patients to two of the treatment programs: a trauma-related disorders outpatient treatment program, aimed specifically at adult survivors of prolonged childhood trauma (*n* = 49), and a personality disorders (PD) treatment program, with both in- and outpatient facilities (*n* = 101). The reason for choosing these diagnostic groups is explained in more detail elsewhere [2]. Briefly: we assumed that a wide range of trauma-related disorders and a reported history of trauma, both in child- and adulthood, are presented within these diagnostic groups. Our only exclusion criterion was insufficient capacity to understand and speak Dutch.

In total, 220 patients were invited to participate in the study. Forty-four patients refused to participate. Another 26 patients did not complete the whole assessment battery. Refusers and partly completers were excluded in the present analysis and considered non-respondents. There were no significant differences between respondents and non-respondents on demographic variables (sex, age, marital status, educational level, and employment status).

Concerning socio-demographic characteristics of patients in the two treatment groups, three significant differences were found. Compared to patients in the personality disorders treatment program, patients in the trauma-related disorders treatment program were more often women (89.8% versus 71.3%, respectively; *p*< .05), older (M_{trauma}= 38.7, SD = 10.0, $M_{personality}$ = 32.1, SD = 12.3; *p*< .001), and more often living with a partner (49.0% versus 22.8%, respectively; *p*< .01).

Measures

Demographic characteristics (sex, age, marital status, educational level, employment status) were obtained using psychiatric records. To establish a valid diagnose of a trauma-related disorder, we used three different (semi) structured clinical interviews. The Clinician Administered PTSD Scale (CAPS) assesses PTSD diagnostic status and dimensional PTSD symptom frequency and intensity. The CAPS has strong psychometric properties [36].

To assess CPTSD as well as the severity of several CPTSD symptom areas, the Structured Interview for Disorders of Extreme Stress [SIDES] [37] was used. It measures criteria often seen in response to extreme trauma and not addressed by DSM-IV criteria for PTSD, arranged into the following categories: regulation of affect and impulses, attention or consciousness, self-perception, relations with others, somatization, and systems of meaning. Findings on the psychometrics of the SIDES indicate

that it is a valid measure of the associated features of PTSD [37].

To assess the presence and severity of the dissociative disorders the Structured Interview for DSM-IV Dissociative Disorders (SCID-D) [38] was used. Psychometric qualities of the SCID-D (validity and reliability) are good [26].

For the measurement of trauma history we preferred an interview over a questionnaire. In our study the Structured Trauma Interview (STI) [34] was used. This instrument addresses ten trauma categories during child- and adulthood. Outcomes range from 'absent' to 'severe'. For childhood physical abuse (CPA) and childhood sexual abuse (CSA) severity ratings depend on additional variables: age of onset, frequency, number of perpetrators and if the trauma occurred within the family. The validity of this interview has been shown by comparisons with other instruments for the assessment of childhood trauma [39] and neglect [40].

Finally, we also included a scale that measures functional impairment. For that purpose we chose the Global Severity Index (GSI) of the Symptom Checklist-90-Revised [SCL-90-R] [41]. The SCL-90 is a 90-item self-report instrument that measures 8 different symptom area's and a total scale that is used as GSI of psychological and physical dysfunctioning during the last week. Psychometric qualities of this instrument are reported as good [42].

Procedure

The Institutional Review Board of Mental Health Institutions (METiGG; registration no. 11.121) approved the study protocol. A patient was contacted by a psychologist after being admitted to the trauma-related disorders treatment program or the personality disorders treatment program. If a patient agreed to participate in the study, informed consent was obtained. The interviews were administered by four thoroughly trained and supervised (by N.D.) psychologists. Interviews were videotaped if a patient agreed to this and evaluated during supervision sessions. To get an indication of the percentage of agreement between the interviewers, two randomly selected videos per structured interview were used, scored by all psychologists. For each interview, inter-rater agreement was based on the percentage of equally scored categories (25 trauma categories on the STI, 38items on the CAPS (all PTSD symptoms, both frequency and intensity), 45 items on the SIDES, and 5 categories on the SCID-D (all symptoms)). Inter-rater agreement for the interviews was high (ranging from 90% to 93%).

We aimed at a random patient population: all patients consecutively referred to the trauma treatment program were included during a period of two years. Due to the larger size of the personality disorders treatment program (this program has both intensive outpatient as well as inpatient facilities) we were unable to cover all departments. Therefore, we included all consecutively referred outpatients and inpatients during multiple months in one department and then moved on to the next.

To test the representativeness of our sample of patients in the personality disorders treatment program (*n* = 101) we compared them on sex and age with the population of patients referred to personality disorders treatment programs (*n* = 1563) during

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the study period. No significant differences were found for sex of the patients. However, compared to our sample, patients in the PD population were significantly older (M_{sample} = 32.1, SD = 12.3, $M_{population}$ = 35.7, SD = 11.5; p< .01), though the effect size was small (r = .07). We conclude that our sample can be considered as a representative reflection of the whole population of patients admitted to the PD programs during the study period.

Data-analysis

Demographic variables were examined, using frequencies. For the clinical data in the present analysis, we used the total scores (calculated by summing across items) of the CAPS, SIDES, and SCID-D.

First, we constructed a 'trauma severity score', based on the sum scores on the STI. We used a range of 0 (= absent) to 1 (= present) for the following ten categories: loss of primary caretakers, witnessing violence between caretakers, CPA, CSA, other stressful events during childhood, physical abuse by a partner, physical abuse by another, sexual abuse by a partner, sexual abuse by another, and other stressful events during adulthood (total range 0 to 10).

For the categories CPA and CSA we added additional severity scores for each type of abuse, using 4 categories: frequency of abuse (incidental = 1; chronic = 2), whether the abuse occurred within the family (outside the family = 1; within the family = 2; both = 3), number of perpetrators (one perpetrator = 1; multiple perpetrators = 2), and age of onset (between 12 and 16 years of age = 1; between 6 and 12 years of age = 2; before 6 years of age = 3). Our 'trauma severity score' thus ranges from 0 to 30.

Due to non-normality of the distributions of variables, we employed Spearman correlations (one-tailed test) among the 'trauma severity score' and the total scores on the CAPS, SIDES, and SCID-D, for the whole sample and for men and women separately.

Third, we constructed a 'trauma-diagnosis severity score'. This is an ordinal scale (0 = no PTSD, 1 = PTSD, 2 = CPTSD, 3 = DDNOS, 4 = DID) based on the outcomes of the CAPS, SIDES, and SCID-D. We classified patients with chronic PTSD as 'PTSD', since all patients in our sample experienced a chronic form of PTSD, making the distinction between 'simple' and 'chronic' PTSD (Figure 1) not meaningful in our sample. Considering comorbidity between these disorders, we classified patients according to their most severe disorder (so PTSD, CPTSD, DDNOS and DID in ascending order).

Fourth, we employed a Spearman correlation (one-tailed test) among the 'trauma-diagnosis severity score' and the GSI of the SCL-90. Finally, we employed a Spearman correlation (one-tailed test) among the 'trauma severity score' and the 'trauma-diagnosis severity score', for the whole sample and for both men and women.

RESULTS

Demographic and clinical information is displayed in Table 1. The trauma severity score ranged from 0 to 29 in our sample (M = 12.8, SD = 8.8). The distribution of the trauma severity score, is significantly non-normal, D(150) = 0.14, p< .001. Spearman correlations among the trauma severity score, with CAPS, SIDES,

and SCID-D total scores, for the total sample and for men and women separately, are shown in Table 2. Significant correlations were found among all variables.

Following our method of classifying patients by their most severe disorder to construct the trauma-diagnosis severity score (M = 2.1, SD = 1.1), 43% of the patients in our sample had no trauma-related disorder, 21% was diagnosed with PTSD, 24% with Complex PTSD, 11% with DSNAO, and 1% with DID. The distribution of the trauma-diagnosis severity score, D (150) = 0.26, p< .001, is significantly non-normal. The trauma-diagnosis severity scores were positively skewed.

We found a significant correlation (r_s = .30; p<0.01; n =150) between trauma-diagnosis severity and SCL-90 GSI-scores. Furthermore, we found a relatively strong correlation (r_s = .54; p< 0.01; n = 150) between reported trauma severity and trauma-diagnosis severity for the whole sample. We also found strong correlations between reported trauma severity and trauma-diagnosis severity for both men (r_s = .44; p< 0.01; n = 34) and women (r_s = .48; p< 0.01; n = 116). After correcting for the low percentage of DID patients in our sample by excluding both female patients from the analysis, correlations stayed the same both for the whole sample (r_s = .54; p< 0.01; n = 148) and for women separately (r_s = .48; p< 0.01; n = 114).

DISCUSSION

We wanted to investigate whether differences in the severity of retrospectively reported traumatic experiences in child- and adulthood are related to the dimension of trauma-related and dissociative disorders in such a way that more severe trauma is linked to more severe disorders. Judging from the strength of the correlation (r_s = .54; p< 0.01; n = 150), we conclude that reported trauma severity is strongly linked to more severe trauma-related pathology. This holds true for both men and women separately.

Table 1: Demographics and clinical characteristics of the sample (n = 150).

Sex (n / %)	
Male	34 (22.7)
Female	116 (77.3)
Age (mean years, SD)	34.2 (11.9)
Partner status (n / %)	
Single	74 (49.3)
Married/living with partner	47 (31.3)
Divorced/widowed	29 (19.4)
Education (n / %)	
Elementary education	14 (9.3)
High school	112 (74.7)
College	24 (16.0)
Employment status (n / %)	
Yes	39 (26.0)
No	111 (74.0)
Trauma-related disorder (n / %)[a]	
(simple and chronic) PTSD	84 (56.0)
Complex PTSD	58 (38.7)
Dissociative disorder NOS	16 (10.7)
Dissociative Identity Disorder	2 (1.3)
[a]Due to comorbidity, the total number exceeds 150	

Table 2: Matrix of Spearman Correlation Coefficients of Trauma Severity (STI), (chronic) PTSD (CAPS), Complex PTSD (SIDES), and dissociative disorders (SCID-D) (*n* = 150).

	STI	CAPS	SIDES	SCID-D
STI				
Sample (*n* =150)	1.00	.64*	.45*	.38*
Men (*n* = 34)	1.00	.67*	.48*	.40*
Women (*n* = 116)	1.00	.58*	.37*	.26*
CAPS				
Sample (*n* = 150)	.64*	1.00	.71*	.61*
Men (*n* = 34)	.67*	1.00	.77*	.54*
Women (*n* = 116)	.58*	1.00	.64*	.57*
SIDES				
Sample (*n* = 150)	.45*	.71*	1.00	.64*
Men (*n* = 34)	.48*	.77*	1.00	.68*
Women (*n* = 116)	.37*	.64*	1.00	.59*
SCID-D				
Sample (*n* = 150)	.38*	.61*	.64*	1.00
Men (*n* = 34)	.40*	.54*	.68*	1.00
Women (*n* = 116)	.26*	.57*	.59*	1.00

*$p< .001$

Abbreviations: STI: Structured Trauma Interview; CAPS: Clinician Administered PTSD Scale; SIDES: Structured Interview for Disorders of Extreme Stress; SCID-D: Structured Interview for DSM-IV Dissociative Disorders

These findings support the continuum hypothesis of trauma-related and dissociative disorders, ranging from less to most extreme.

In comparison with DSM-IV, the idea of a trauma continuum has been incorporated in DSM-5 to a slightly stronger extent, due to changes made in the description of PTSD. The idea of a complex form of PTSD is incorporated to some extent by including a dissociative subtype of PTSD in DSM-5. CPTSD symptoms - for example reckless or self-destructive behavior -are now added to the DSM-5 PTSD profile, allowing including more severe cases under this heading. Furthermore, PTSD has been separated from the anxiety disorders and has been categorized as a trauma- and stressor-related disorder. However, this group of disorders is still separated from the dissociative disorders.

Our trauma-diagnosis severity score underlines the idea that, due to high comorbidity, and the gradual increase in severity, it might be less useful to consider diagnostic entities as separate and categorical. Instead, it is preferred to elaborate on dimensional thinking, such as is being suggested in diagnostic profiling. The severity of dissociative symptoms, preferably assessed by a structured clinical interview, is likely to be a clue in differentiating between less and more complicated pathology. It could also help to mark cases in which stabilizing interventions, directed towards the person of the patient, may precede more symptom focused interventions such as exposure [43].

Elaborating on the existing literature considering trauma severity [31-34], we constructed a sum score of aversive childhood experiences to create a trauma severity scale. However, a limitation of our study is that we depended exclusively on retrospective self-reports to establish trauma severity, which limits the reliability and validity of these assessments. Scientifically a longitudinal design, using other sources besides self-report, would be the ideal way to measure traumatic life events, but clinically that does not make sense. However, the accuracy and reliability of recall among survivors of child maltreatment, as corroborated by protective service records, has proven to be substantial [44].

Also, it was not possible to blind interviewers for information considering the treatment program for which the patient was indicated, which might have biased expectations about the severity of the reported trauma in patients indicated for trauma treatment. Since our data collection started in 2011, we were not able to incorporate measurements that assess trauma-related and dissociative disorders according to DSM-5.

A strength of our study is that we used structured clinical interviews to establish trauma history as well as to assess trauma-related and dissociative disorders. According to Bernstein and colleagues [32] the ease of administration and relative non-invasiveness of a self-report trauma questionnaire makes it an appropriate screening instrument for clinical or research purposes. However, the most frequently used instrument worldwide, the CTQ [32], does not inquire about aspects of trauma, such as age at onset and relationship of perpetrator to victim. This type of data is more accurately obtained through a structured interview format [32]. We also used structured clinical interviews to establish a clinical diagnose, resulting in a well-diagnosed sample of patients. Furthermore, we conducted the interviews within a naturalistic setting, consisting of patients seeking help in a specialized mental health care facility.

CONCLUSION

The findings support the existence of the y-axis of the proposed dimensional model [1], which presumes a relationship between a dimension of trauma-related and dissociative disorders on the one hand and differences in the severity of the trauma endured at the other. The findings also support a trauma-related disorder spectrum approach [14,17].

Future research should attempt to quantify the x-axis of the model, which stands for neglect and its relationship to the severity of personality disorders. Draijer & Langeland [40] found in their study on childhood trauma in the etiology of dissociative symptoms, that symptom severity was best predicted by reported CSA, CPA, and maternal dysfunction. They concluded that dissociation is both trauma-related and neglect-related. Findings of a systematic review of longitudinal studies of childhood maltreatment and mental health outcomes confirm that neglect is at least as damaging as physical or sexual abuse in the long term [7]. However, neglect has received the least scientific and public attention. It might be that neglect especially leads to personality pathology, on top or besides of trauma-related and dissociative pathology.

Future research should also attempt to test if the supposed trauma spectrum has implications for treatment indication and staging of treatment, i.e. that the more severe trauma related disorders show less and slower clinical improvement than the pure 'simple' ones such as PTSD. This will be tested in follow up [45].

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