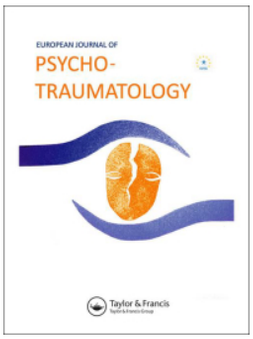

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Psychometric properties of the dissociative subtype of posttraumatic stress disorder scale: replication and extension in two German-speaking samples

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CLINICAL RESEARCH ARTICLE

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Psychometric properties of the dissociative subtype of posttraumatic stress disorder scale: replication and extension in two German-speaking samples

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ABSTRACT

Background: The fifth version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) introduced the dissociative subtype of posttraumatic stress disorder (D-PTSD). To assess this subtype, the Dissociative Subtype of PTSD Scale (DSPS), a 15-item self-report measure to identify lifetime and current dissociative symptoms of D-PTSD, was developed. However, so far, the scale has only been validated in war veterans. Moreover, criterion validity and diagnostic utility have not been examined yet.

Objective: We aimed to validate the DSPS in two samples of civilian trauma-exposed German-speaking participants.

Methods: In Study 1, a pre-registered online study, participants with and without PTSD symptoms ($N = 558$) answered questionnaires about traumatic experiences, dissociation, PTSD, depression, generalized anxiety disorder, somatic symptom disorder, alcohol use disorder, absorption, and dissociative responding to trauma-related questionnaires. In Study 2, which used secondary data of a pre-registered clinical study, participants with a PTSD diagnosis ($N = 71$) answered questionnaires about traumatic experiences, dissociation, PTSD, depression, generalized anxiety disorder, somatic symptom disorder, and dissociative responding to standardized trauma exposure. Moreover, PTSD, D-PTSD, and other diagnoses were assessed with structured clinical interviews.

Results: Analyses confirmed a three-factor structure as well as high internal consistency, and high convergent, discriminant, and criterion validity of the DSPS. Moreover, the scale was able to identify a latent D-PTSD group and individuals with D-PTSD diagnosis.

Conclusions: The DSPS constitutes a reliable and valid tool to assess D-PTSD symptoms in clinical practice and research and thereby may contribute to a better understanding of these debilitating symptoms.

Propiedades psicométricas de la escala del subtipo disociativo del trastorno de estrés postraumático: Replicación y ampliación en dos muestras de habla alemana

Antecedentes: La quinta versión del Manual Diagnóstico y Estadístico de los Trastornos Mentales (DSM-5) introdujo el subtipo disociativo del trastorno de estrés postraumático (TEPT-D). Para evaluar este subtipo, Wolf et al. (2017) desarrollaron la Escala del Subtipo Disociativo del TEPT (DSPS por sus siglas en ingles), una medida de autoinforme de 15 ítems para identificar los síntomas disociativos vitales y actuales del TEPT-D. Sin embargo, hasta ahora, la escala solo se ha validado en veteranos de guerra. Además, aún no se ha examinado la validez de criterio ni la utilidad diagnóstica.

Objetivo: Nuestro objetivo era validar la DSPS en dos muestras de participantes civiles de habla alemana expuestos a traumas.

Métodos: En el Estudio 1, un estudio online registrado previamente, los participantes con y sin síntomas de TEPT ($N = 558$) respondieron a cuestionarios sobre experiencias traumáticas, disociación, TEPT, depresión, trastorno de ansiedad generalizada, trastorno por síntomas somáticos, trastorno por consumo de alcohol, absorción y respuesta disociativa a cuestionarios relacionados con el trauma. En el Estudio 2, que utilizó datos secundarios de un estudio clínico registrado previamente, los participantes con diagnóstico de TEPT ($N = 71$) respondieron a cuestionarios sobre experiencias traumáticas, disociación, TEPT, depresión,

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关键词
解离; 创伤后应激障碍; 评估; 问卷; 量表; 工具; 德语; 乌克兰语; 阿尔巴尼亚语; 验证

HIGHLIGHTS

- Many individuals with posttraumatic stress disorder (PTSD) suffer from dissociative symptoms which can be assessed with the Dissociative Subtype of PTSD Scale (DSPS; Wolf et al., 2017).
- The DSPS demonstrated good psychometric properties in two German-speaking trauma-exposed samples and hence might be used to assess D-PTSD symptoms in research and clinical practice.
- Complementing the original English version, a German version of the DSPS is provided in the Supplements.

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trastorno de ansiedad generalizada, trastorno de síntomas somáticos y respuesta disociativa a la exposición estandarizada al trauma. Además, se evaluaron el TEPT, el TEPT-D y otros diagnósticos mediante entrevistas clínicas estructuradas.
Resultados: Los análisis confirmaron una estructura trifactorial, así como una elevada consistencia interna y una alta validez convergente, discriminante y de criterio de la DSPS. Además, la escala fue capaz de identificar un grupo latente de TEPT-D e individuos con diagnóstico de TEPT-D.
Conclusiones: La DSPS constituye una herramienta fiable y válida para evaluar los síntomas del D-PTSD en la práctica clínica y la investigación y, por lo tanto, puede contribuir a una mejor comprensión de estos síntomas debilitantes.

创伤后应激障碍解离亚型量表的心理测量特性：在两个德语样本中的重复和扩展

背景：第五版精神障碍诊断与统计手册（DSM-5）引入了创伤后应激障碍的解离亚型（D-PTSD）。为了评估这种亚型，Wolf 等人 (2017) 开发了 PTSD 解离亚型量表 (DSPS)，一个包含 15个条目的自我报告测量，用于识别 D-PTSD 终身和当前的解离症状。然而，到目前为止，该量表仅在退伍军人中得到验证。 此外，标准效度和诊断实用性尚未得到检验。
目的：我们旨在于两个创伤暴露的德语普通参与者样本中验证 DSPS。
方法：在研究 1（一项预注册的在线研究）中，有或没有 PTSD 症状的参与者 ($N = 558$) 回答了有关创伤经历、解离、PTSD、抑郁、广泛性焦虑障碍、躯体症状障碍、酒精使用障碍、吸收、以及对创伤相关问卷的分离反应。在研究 2 中，使用了预注册临床研究的二手数据，有 PTSD 诊断的参与者 ($N = 71$) 回答了关于创伤经历、解离、PTSD、抑郁、广泛性焦虑障碍、躯体症状障碍和对标准化创伤暴露的解离反应的问卷。此外，PTSD、D-PTSD 和其他诊断均通过结构化临床访谈进行评估。
结果：分析证实了 DSPS 的三因素结构以及高内部一致性、高收敛性、判别性和标准有效性。此外，该量表能够识别潜在 D-PTSD 群体和有 D-PTSD 诊断的个体。
结论：DSPS 构成了临床实践和研究中评估 D-PTSD 症状的可靠且有效的工具，从而可能有助于更好了解这些使人衰弱的症状。

1. Introduction

In the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), the American Psychiatric Association (2013) introduced the dissociative subtype of posttraumatic stress disorder (D-PTSD) to characterize individuals with PTSD who also suffer from dissociative symptoms like depersonalization (i.e. feeling detached from the own body or mental processes) or derealization (i.e. feeling detached from the world). Estimates for the percentage of trauma survivors with PTSD who also meet criteria for D-PTSD range from 22.8%, in studies using latent class analyses (LCA) and latent profile analyses (LPA) to identify PTSD subgroups, to 48.1%, in studies applying DSM-5 criteria (White et al., 2022).

Empirical studies partly link D-PTSD to specific risk factors, neurobiological alterations, elevated symptom severity, comorbidity, chronicity and functional impairment as well as differential treatment outcomes (for reviews see Atchley & Bedford, 2021; Beutler et al., 2022; Lanius et al., 2010; Roydeva & Reinders, 2021; Schiavone et al., 2018). However, results are still inconclusive, which might not least be due to studies using different measures for the dissociative symptoms of D-PTSD. Many studies have used instruments not specifically tailored to measure D-PTSD and therefore lacking conformity with the DSM-5 definition of D-PTSD (Schiavone et al., 2018; Wolf et al., 2017). Moreover, measures used in earlier research have been criticized for conceptual overlaps with nonpathological traits like fantasy proneness and absorption, for response options that were difficult to interpret (e.g. assessing symptom frequency on a scale from 'never' to 'always'), and for only assessing symptom frequency but not symptom intensity or severity (Giesbrecht et al., 2008; Wolf et al., 2017).

To overcome these limitations, specific measures for dissociative symptoms of D-PTSD have been developed. On the one hand, structured interviews like the Clinical Administered PTSD Scale for DSM-5 (CAPS; Weathers et al., 2018; Weathers, Blake, et al., 2013b) and the Dissociative Subtype of PTSD Interview (DSP-I; Eidhof et al., 2019) have been introduced, which can be considered the gold-standard for diagnosing D-PTSD (Deen et al., 2022). However, as interviews require a substantial amount of time and financial resources (Phellas et al., 2011), they are often not feasible. In these situations, self-administered scales constitute a valuable alternative to screen for D-PTSD symptoms and/or assess symptom severity over time.

In this spirit, Wolf and colleagues (2017) developed the Dissociative Subtype of PTSD Scale (DSPS), a 15-item self-administered scale assessing the dissociative symptoms defining D-PTSD and other dissociative symptoms frequently experienced by trauma-survivors (see Table 4 for item descriptions; see the website of the National Center for PTSD (2017) for

the full questionnaire). Overcoming limitations of dissociation questionnaires not tailored to D-PTSD, the DSPS uses multiple items to assess D-PTSD symptoms in accordance with DSM-5 (i.e. derealization/depersonalization), while not neglecting other dissociative symptoms (i.e. loss of awareness, psychogenic amnesia). Moreover, it does so in detail by assessing lifetime and current (past month) symptom presence as well as current symptom frequency and intensity. To identify D-PTSD symptoms in line with the DSM-5, the authors recommend inspecting scores of the derealization/depersonalization subscale.

So far, the psychometric properties of the DSPS have been evaluated in two studies with trauma-exposed veterans with and without current PTSD symptoms (Guetta et al., 2019; Wolf et al., 2017). Wolf et al. (2017) validated lifetime scores, whereas Guetta et al. (2019) validated current scores. Exploratory and confirmatory factor analyses suggested a three-factor structure including (1) derealization/depersonalization, (2) loss of awareness, and (3) psychogenic amnesia. Internal consistency was mostly acceptable for the total score and the three subscales. As expected, the DSPS (with the exception of the amnesia subscale) showed high correlations with other dissociation measures, moderate to high correlations with PTSD measures, and moderate correlations with absorption, suggesting good convergent and discriminant validity. Lastly, latent profile analyses supported the scale´s ability to detect a latent D-PTSD group with high PTSD and high dissociative symptoms (Guetta et al., 2019; Wolf et al., 2017), and receiver operating characteristic curve (ROC) analyses pointed to ≥2 (interview version)/ ≥ 4 (self-report version) endorsed current derealization/depersonalization items indicating current D-PTSD latent profile membership (Guetta et al., 2019).

However, albeit promising, these initial validation studies suffer from several shortcomings. Both samples were primarily composed of older male war veterans, limiting the generalizability of results and warranting examination in samples with broader ranges of age, sex, and trauma types. Moreover, the assessment of convergent and divergent validity was restricted to self-report measures of dissociation, PTSD, and personality traits like absorption, while it might be of interest to also assess divergent validity with regard to other forms of psychopathology and to also take into account interview measures of dissociation, PTSD, and other forms of psychopathology. Further, criterion validity, i.e. the ability of the scale to predict future dissociative responding in situations likely to evoke dissociation (e.g. trauma-related stimuli; Vancappel et al., 2022), has not been examined yet. Last, although the scale's ability to identify D-PTSD latent profile membership is auspicious, it is of utmost clinical importance to empirically examine the scale's ability to identify actual D-PTSD diagnosis.

Addressing these gaps, the current paper evaluates psychometric properties of both, lifetime and current DSPS scales, thereby constituting the first replication attempt for the original findings (Guetta et al., 2019; Wolf et al., 2017), within two samples with broader ranges of age, sex, and trauma types. Study 1, a pre-registered online study in trauma-exposed participants with and without PTSD symptoms ($N = 558$), employed self-report measures of traumatic experiences, dissociation, PTSD, depression, generalized anxiety disorder, somatic symptom disorder, alcohol use disorder, absorption, and dissociative responding to trauma-related questionnaires. Study 2, which uses secondary data of a pre-registered clinical study in participants with PTSD diagnosis ($N = 71$), employed self-report measures of traumatic experiences, dissociation, PTSD, depression, generalized anxiety disorder, somatic symptom disorder, and dissociative responding to standardized trauma exposure. In addition, PTSD, D-PTSD, and other diagnoses were assessed using clinical interviews.

Replicating and extending prior findings (Guetta et al., 2019; Wolf et al., 2017), we expected a three-factor structure (Study 1) as well as acceptable internal consistencies (Studies 1 & 2). Moreover, we expected high correlations between the DSPS and self-report as well as interview measures of dissociation and PTSD, i.e. convergent validity, and low to moderate correlations with self-report and interview measures of other psychopathology and absorption, i.e. discriminant validity (Studies 1 & 2). Further, we investigated criterion validity of the DSPS by examining the ability of the DSPS to predict dissociative responding to trauma-related questionnaires (Study 1) and to standardized trauma-script exposure (Study 2). Last, we aimed to replicate the scale's ability to detect a latent participant group characterized by high PTSD and high dissociative symptoms (Study 1) and examined whether the DSPS is able to identify D-PTSD diagnosis (Study 2).

2. Methods

2.1 The DSPS

The DSPS consists of three subscales assessing derealization/depersonalization with seven items (1, 3, 5, 7, 8, 9, 12), loss of awareness with six items (2, 4, 6, 10, 11, 13), and psychogenic amnesia with two items (14, 15). For each item, participants report a) whether they have ever experienced the described symptom ('yes/no'), b) whether they have experienced it in the past month ('yes/no'), c) past month symptom frequency (0 = 'never', 1 = 'once or twice', 2 = 'once or twice a week', 3 = 'three or four times a week' and 4 = 'daily'), d) past month symptom intensity (0 = 'N/

A', 1 = 'not very strong', 2 = 'somewhat strong', 3 = 'moderately strong', 4 = 'very strong' and 5 = 'extremely strong') and e) whether the symptom only occurred when they were tired or on medication or drugs that made them tired ('yes/no'). Please note that, to align with other established measures of dissociation (Carlson & Putnam, 1993; Spitzer et al., 2004), the present studies modified the latter question to e) whether the symptom only occurred when participants were tired or under the influence of alcohol, medication or drugs. When participants affirm the latter, all responses for the respective item are set to zero. For the total scale and each subscale, three scores are calculated (1) endorsed lifetime items, i.e. the number of affirmed lifetime items, (2) endorsed current items, i.e. the number of current items with frequency ≥1 and intensity ≥3 and (3) current item severity, i.e. the sum of all frequencies and intensities.

As the present studies were conducted in German-speaking countries, the DSPS was translated into German following established guidelines (Schmitt & Eid, 2007; Sousa & Rojjanasrirat, 2011): Two native German speakers, with and without knowledge of the dissociation construct, provided independent German translations. Discrepancies between translations were discussed in the research team and solved by consensus, resulting in a first German version. This version was back-translated by two native English speakers, with and without knowledge of the dissociation construct and blind to the original version. Discrepancies between back-translated versions and the original DSPS were discussed with a developer of the original DSPS and solved by consensus. The German version was adapted accordingly, resulting in the final German DSPS which is provided in the Supplement. Ukrainian and Albanian versions of the DSPS, which have been developed using similar procedures and which are currently undergoing validation, are provided elsewhere (see Danböck, Hettegger, et al., 2023).

2.2 Study 1

2.2.1 Participants and procedure

Study 1 constitutes a pre-registered online study (see https://doi.org/10.17605/OSF.IO/RKM9V) in trauma-exposed participants ($N = 558$). The study was approved by the local Ethics Committee. Participants were recruited through public ads and the German nationwide online panel Psyweb (https://psyweb.uni-muenster.de). Main inclusion criteria were a minimum age of 18 years, good German language skills, and the experience of at least one traumatic event in the past. Participants had been exposed to different traumatic events (see Table 1) and varied in their level of PTSD symptoms and other psychopathology, with 79% of participants reporting symptoms above at least one clinical cutoff (see Table 2). Participants described themselves as female (76%) or male (24%), were aged between 18 and 79 (M = 41.88, SD = 15.48), and mostly reported German or Austrian nationality (99%). For further demographics see Table S1.

Table 1. Trauma exposure.

Reported trauma exposure	Study 1 ($N = 558$)	Study 2 ($N = 71$)
Natural disaster	42%	35%
Fire or explosion	43%	44%
Transportation accident	73%	65%
Serious accident at work, home, or during recreational activity	45%	62%
Exposure to toxic substance	18%	15%
Physical assault	61%	62%
Assault with a weapon	34%	35%
Sexual assault	54%	66%
Other unwanted or uncomfortable sexual experience	61%	65%
Combat or exposure to a war-zone	14%	14%
Captivity	13%	15%
Life-threatening illness or injury	58%	61%
Severe human suffering	70%	65%
Sudden violent death	56%	55%
Sudden accidental death	46%	45%
Serious injury, harm, or death caused by the person to someone else	8%	10%
Any other very stressful event or experience	40%	41%
Physical assault in childhood	38%	35%
Physical neglect in childhood	59%	66%
Sexual assault in childhood	53%	49%

Note. Lifetime trauma exposure was assessed with the Life Event Checklist for DSM-5 (LEC-5) and childhood trauma with the Childhood Trauma Questionnaire (CTQ). In line with the DSM-5 (American Psychiatric Association, 2013), lifetime trauma exposure was defined as experiencing or witnessing the respective event, learning about it happening to a close relative or friend (only for events involving violence or an accident), or being job-wise confronted with it. In line with prior work (Häuser et al., 2011), childhood trauma exposure was defined as CTQ rating of at least 'slight to moderate' (equalling a score ≥8 for physical assault, a score ≥8 for physical neglect, and a score ≥6 for sexual assault; Glaesmer, 2016).

After providing informed consent, participants indicated their level of state dissociation during the past few minutes and were asked to report demographics, traumatic experiences, as well as lifetime and current PTSD symptoms. Next, they were requested to indicate symptoms of dissociation on two questionnaires presented in randomized order. Afterwards, they were asked to report symptoms of depression, generalized anxiety disorder, somatic symptom disorder, alcohol use disorder, and the personality trait absorption on questionnaires presented in randomized order. Last, participants indicated their level of state dissociation during the survey and were offered individualized feedback on symptom and absorption questionnaires.

2.2.2 Measures

Measures are summarized in Table 3. Current symptom questionnaires were adapted to refer to the last month.

2.3 Study 2

2.3.1 Participants and procedure

Study 2 used secondary data of a pre-registered clinical study (see https://doi.org/10.17605/OSF.IO/PMGFT,

Table 2. Psychometric sample characteristics.

Variable	Clinical Cutoff	Study 1 ($N = 558$)		Study 2 ($N = 71$)	
		M (SD)	% >cutoff	M (SD)	% >cutoff
PCL-5 (0-80)	≥ 33/ Scoring algorithm	21.82 (19.27)	28%/ 29%	46.17 (12.79)	87%/ 85%
FDS-20 (0-90)	≥ 13	17.60 (18.62)	45%	22.18 (17.24)	62%
PHQ-9 (0-27)	≥ 10	10.46 (6.75)	49%	14.52 (5.14)	82%
GAD-7 (0-27)	≥ 10	8.60 (5.59)	41%	11.55 (5.1)	61%
SSS-8 (0-32)	≥ 9	11.71 (6.81)	64%	14.92 (6.44)	89%
SSD-12 (0-48)	≥ 23	13.42 (10.59)	18%	17.89 (11.6)	31%
AUDIT (0-12)	≥3/ 4 (women/men)	2.33 (2.13)	38%	–	–
DSPS current severity (0-135)	–	14.53 (22.18)	–	22.46 (20.79)	
RSDI-change (-24-24)	–	−2.35 (6.03)	–	3.92 (6.55)	–

Note. A PCL-5 score ≥33 indicates clinically relevant current PTSD symptoms according to a dimensional cutoff (Krüger-Gottschalk et al., 2017). For comparison purposes we also report the percentage of individuals with a probable current PTSD as assessed using the DSM-5 scoring algorithm of the PCL-5 (Bovin et al., 2016). An FDS-20 score ≥13 indicates clinically relevant dissociative symptoms (Rodewald et al., 2006). A PHQ-9 score ≥10 indicates at least moderate depressive symptoms (Kroenke et al., 2001). A GAD-7 score ≥10 indicates at least moderate generalized anxiety disorder symptoms (Spitzer et al., 2006). An SSS-8 score ≥9 in conjunction with an SSD-12 score ≥23 indicates an increased risk of somatic symptom disorder (Toussaint et al., 2020). An AUDIT score ≥3/ 4 (women/ men) indicates an increased risk of alcohol use disorder (Bradley et al., 2003; Bush et al., 1998). RSDI-change scores reflect dissociative responding to trauma-reminders (Study 1: Survey minus before survey; Study 2: Trauma script minus first neutral script). Abbreviations: PCL-5 = PTSD Checklist for DSM-5; FDS-20 = German shortform of the Dissociative Experiences Questionnaire; PHQ-9 = Patient Health Questionaire-9; GAD-7 = Generalized Anxiety Disorder Scale-7; SSS-8 = Somatic Symptom Scale-8; SSD-12 = Somatic Symptom Disorder- B Criteria Scale; AUDIT = Alcohol Use Disorder Identification Test; DSPS = Dissociative Subtype of PTSD Scale; RSDI = Response to Script Driven Imagery Scale, dissociation subscale.

main findings reported by Danböck, Liedlgruber, et al., 2023) in individuals with PTSD ($N = 71$). The study was approved by the local Ethics Committee. Inclusion criteria were age between 18 and 65 years, good German language skills and a PTSD diagnosis according to DSM-5 (assessed with the CAPS for DSM-5; Weathers, Blake, et al., 2013b). Exclusion criteria were (hypo-)manic episodes, psychotic disorder, alcohol use disorder or substance use disorder within the last year, and acute suicidality within the last two weeks (assessed with the Mini-International Neuropsychiatric Interview for DSM-5; M.I.N.I. 7.0.2; Sheehan et al., 1998). All participants fulfilled PTSD criteria, 45% of participants additionally fulfilled D-PTSD criteria. Participants had been exposed to heterogenous traumatic events (see Table 1), displayed high levels of PTSD symptoms, and varied in their levels of other psychopathologies (see Table 2). Participants described themselves as female (82%), male (17%), or non-binary (1%), were aged between 18 and 64 (M = 37.27, SD = 15.23), and mostly reported German or Austrian nationality (92%). For further demographics see Table S1.

After providing informed consent, participants completed a written pre-assessment (online/ paper-and-pencil), an interview session, an experimental session, and a written post-assessment (online/ paper-and-pencil). Here, only elements relevant for the present analyses are described. During the pre-assessment, participants reported demographic information, traumatic experiences, as well as current symptoms of PTSD, dissociation (two questionnaires), depression, generalized anxiety disorder, and somatic symptom disorder in fixed order. During the interview session, PTSD, D-PTSD and other psychiatric disorders were assessed with structured clinical interviews. Moreover, details of the worst traumatic experience were assessed using a standardized trauma interview and potentially neutral situations were rated regarding their valence and familiarity. During the experimental session, participants were exposed to an adaptation script, a first personally tailored neutral script, a personalized trauma script, and a second personally tailored neutral script (each 3.5 min). Participants were asked to imagine the described scenes as vividly as possible. After each script, participants reported their level of state dissociation during the script. For further details see Danböck, Liedlgruber, et al. (2023).

2.3.2 Measures

Measures are summarized in Table 3. Current symptom questionnaires were adapted to refer to the last two weeks.

2.4 Statistical analysis

All statistical analyses were conducted using R versions 4.0.3 and 4.1.1 (R Core Team, 2019). Effects were deemed significant if 95% Confidence intervals (CIs)/ Credibility intervals (CrIs) did not contain zero, indicating statistical significance on a 5% level.

Factor structure of DSPS lifetime and current severity items was determined with confirmatory factor analyses (CFA) using the R-package lavaan (Rosseel, 2012). To account for non-normally distributed, dichotomous data in DSPS lifetime and non-normally distributed continuous data in DSPS current severity items, the Weighted Least Square Mean and Variance Adjusted estimator (WLSMV) was used for the former and the Robust Maximum Likelihood estimator (MLR) was used for the latter analyses. Factors were allowed to be correlated. Model fit was evaluated by $\chi 2$, Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Confirmatory Fit Index (CFI), and Tucker-Lewis Index (TLI). Based on Hu and Bentler (1999) and Mair (2018), RMSEA values with a maximal upper CI bound close to .10, SRMSR with a maximal

Table 3. Overview of measures.

Abb.	Instrument	Description	Study 1	Study 2
Clinical interviews				
CAPS-5	Clinician Administered PTSD Scale for DSM-5 (Müller-Engelmann et al., 2020; Weathers, Blake, et al., 2013b; Weathers et al., 2018)	Structured clinical interview assessing DSM-5 criteria for PTSD and D-PTSD.	–	X
M.I.N.I. 7.0.2	Mini-International Neuropsychiatric Interview for DSM-5 (Ackenheil et al., 1999; Sheehan et al., 1998)	Structured clinical interview assessing DSM-5 criteria for different psychiatric disorders (e.g. major depression, generalized anxiety disorder).	–	X
Traumatic life event questionnaires				
LEC-5	Life Event Checklist for DSM-5 (Ehring et al., 2014; Weathers, Blake, et al., 2013a)	Aversive life events exposure (17 items). Each item referring to one event. Rating whether (a) the event happened to the participant personally, (b) the participant witnessed it happen to somebody else, (c) the participant learned about it happening to a close family member or a close friend, (d) the participant was exposed to it as part of their job, (e) the participant is not sure if it fits, and (f) the event does not apply to them.	X	X
CTQ	Childhood Trauma Questionnaire (Bernstein et al., 1994; Klinitzke et al., 2012)	Childhood trauma history (28 items). Subscales for emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, and denial tendencies. Each item constituting a statement about the participant's childhood. Items rated on a 5-point-Likert-Scale (1='never true' to 5='very often true').	X	X
Psychopathology questionnaires				
PCL-5	PTSD Checklist for DSM-5 (Krüger-Gottschalk et al., 2017; Weathers, Litz, et al., 2013)	PTSD symptoms according to DSM-5 (20 items). Each item describing one symptom. Rating of lifetime experience of each symptom ('yes/no') following Guetta et al. (2019). Rating of current symptom burden on a 5-point-Likert-Scale (0='Not at all', 1='A little bit', 2='Moderately', 3='Quite a bit' and 4='Extremely').	Life Past month	Past two weeks
FDS-20	German shortform of the Dissociative Experiences Questionnaire (Carlson & Putnam, 1993; Spitzer et al., 2004)	Dissociative experiences (20 items). Each item describing one experience. Rating of current symptom frequency on a 11-point-Likert-Scale (0%='never' to 100%='always'). Instruction to not consider experiences under the influence of alcohol, drugs, or medication.	Past month	Past two weeks
PHQ-9	Patient Health Questionaire-9 (Kroenke et al., 2001; Löwe et al., 2002)	Depressive symptoms according to DSM-IV (9 items). Each item describing one symptom. Rating of current symptom frequency on a 4-point-Likert-Scale (0='Not at all', 1=' Several days', 2='More than half the days', and 3='Nearly every day').	Past month	Past two weeks
GAD-7	Generalized Anxiety Disorder Scale-7 (Löwe et al., 2007; Spitzer et al., 2006)	Generalized anxiety disorder symptoms according to DSM-IV (7 items). Each item describing one symptom. Rating of current symptom frequency on a 4-point-Likert-Scale (0='Not at all', 1=' Several days', 2='More than half the days', and 3='Nearly every day').	Past month	Past two weeks
SSS-8	Somatic symptom scale-8 (Gierk et al., 2014)	Somatic symptoms of Somatic Symptom Disorder (SSD) according to DSM-5 (8 items). Rating of current symptom burden on a 5-point-Likert Scale (0='Not at all', 1='A little bit', 2='Somewhat', 3='Quite a bit' and 4='Very much').	Past month	Past two weeks
SSD-12	Somatic symptom disorder scale-12 (Toussaint et al., 2016)	Cognitive, affective, and behavioral aspects of SSD according to DSM-5 (12 items). Rating whether statements apply on a 5-point-Likert-Scale (0='never', 1='rarely', 2='sometimes', 3='often', and 4='very often').	Overall	Overall
AUDIT	Alcohol Use Disorder Identification Test (Bush et al., 1998; Dybek et al., 2006)	Alcohol use disorder symptoms (3 items). Rating of statements on a 5-point-Likert-Scale (0 to 4, descriptions vary between items).	Overall	–
RSDI	Response to Script Driven Imagery Scale, dissociation (Hopper et al., 2007)	Acute dissociation (4 items). Two items describing depersonalization, two items describing derealization. Rating to what extent participants experienced each state on a 7-point-Likert-Scale (0='Not at all' to 6='A great deal').	Before survey; Survey	Neutral script 1; Trauma script
Personality trait questionnaires				
MPQ-BF	Multidimensional Personality Questionnaire – Brief version, absorption items (Patrick et al., 2002; Ritz et al., 1993)	Absorption (12 items). Rating whether statements apply on a 5-point-Likert-Scale (0='not', 1='a little bit', 2='partial', 3='mainly', and 4='completely').	Overall	–

Note. Abbreviations: Abb = Abbreviation.

value close to 0.08, and CFI and TLI with a minimal value close to .95 were considered acceptable. A non-significant χ^2 value indicates a good model fit. However, since *p*-values most likely become significant in large samples (Mair, 2018), we did not assume a poor model fit in case of a significant χ^2. Factor structure was only evaluated in Study 1, as Study 2 was not sufficiently powered for this analysis.

Internal consistency was evaluated using Cronbach's alpha. Convergent and divergent validity were determined using Pearson correlations with bootstrapped confidence interval (BCa CI) accounting for non-normally distributed data. Criterion validity was evaluated with Bayesian regression models using the Stan-based R-package brms (Bürkner, 2017; Carpenter et al., 2017). Dissociative responding to trauma-reminders (Study 1: Survey minus before survey; Study 2: Trauma script minus first neutral script), fitted with student distributions, served as external validation criteria. DSPS total and DSPS derealization/depersonalization scores served as predictors.

The ability of the DSPS to detect a latent D-PTSD group was evaluated using latent profile analyses calculated with the R-package tidy LPA (Rosenberg et al.,

2018). Z-standardized PTSD symptom cluster and derealization/depersonalization values were used as indicator variables in lifetime and current analyses. Models with two to five classes were tested. As recommended by Weller et al. (2020), model fit was evaluated based on Bayesian Information Criterion (BIC), Akaike Information Criteria (AIC), Sample Size Adjusted Bayesian Information Criterion (SABIC), the Bootstrapped likelihood ratio test (BLRT), the Smallest Average Latent Class Posterior Probability (ALCPP), and entropy. Additionally, the Lo-Mendel-Rubin adjusted likelihood ratio test (LMRA) and the Log-Likelihood value (LL) were consulted. Smaller BIC, AIC, and SABIC were preferred. Smallest ALCPP and entropy values ≥ 0.8 were considered acceptable. Higher smallest ALCPP, entropy, as well as LL indicated a better fit. A significant LMRA and BLRT indicated the superiority of the tested model against the model with less profiles. Models with profiles smaller than 5% of the sample were discarded due to a lack of representativeness. Last, models with greater interpretability were preferred. For the final model, differences in indicator variables as well as childhood trauma exposure, anxiety, and depression between profiles were exploratively analyzed using robust ANOVA. Latent profile analyses were only conducted in Study 1, as Study 2 was not sufficiently powered for these analyses.

The ability of the DSPS derealization/depersonalization number of current endorsed items to identify D-PTSD diagnosis assessed with the CAPS was evaluated using a ROC calculated with the R-package pROC (Robin et al., 2011). For cut-point identification, a sum score of endorsed items on the derealization/depersonalization scale was calculated following the endorsement rule by Guetta et al. (frequency ≥ 1 and intensity ≥ 3; 2019). Values for area under the curve (AUC), sensitivity, specificity, positive and negative predictive power, as well as accuracy were evaluated. As Study 1 did not assess D-PTSD diagnosis, ROC analyses were only conducted in Study 2.

3. Results

3.1 DSPS item endorsement

DSPS current and lifetime item endorsement per study and participant group is reported in Table 4. Item endorsement across studies and participant groups ranged between 1% and 79%. Overall, individuals with possible lifetime PTSD endorsed more lifetime dissociation items than individuals without possible lifetime PTSD. Similarly, individuals with current PTSD endorsed more current dissociation items than individuals without possible current PTSD.

3.2 Factor structure

Confirmatory factor analysis indicated a good fit of the three-factor structure for lifetime items, $\chi 2(87) =$

Table 4. DSPS lifetime and current item endorsement.

		Study 1 ($N = 558$)						Study 2 ($N = 71$)	
		Lifetime item endorsement			Current item endorsement			Lifetime item endorsement	Current item endorsement
	Item description	Lifetime PTSD ($n = 387$)	No lifetime PTSD ($n = 171$)	φ	Current PTSD ($n = 162$)	No current PTSD ($n = 396$)	φ	Current PTSD ($N = 71$)	Current PTSD ($N = 71$)
1	Feeling disconnected from one's body	60%	24%	.33***	37%	3%	.45***	79%	24%
2	Feeling 'checked out'	67%	22%	.41***	41%	6%	.44***	79%	30%
3	Feeling outside of one's body	49%	19%	.28***	19%	2%	.30***	59%	4%
4	Having 'lost time'	54%	15%	.37***	33%	4%	.39***	65%	18%
5	Not recognizing oneself in the mirror	37%	11%	.27***	21%	3%	.31***	48%	11%
6	A familiar place seeming strange	52%	19%	.30***	20%	2%	.30***	58%	8%
7	One's body not feeling real	59%	24%	.32***	41%	4%	.48***	73%	13%
8	The world not seeming real	62%	28%	.31***	30%	5%	.35***	69%	18%
9	One's body feeling strange or unfamiliar	49%	15%	.32***	25%	2%	.37***	61%	10%
10	Feeling lost, disoriented, or confused in a known location	44%	10%	.33***	25%	2%	.37***	65%	8%
11	Feeling as if in a daze or fog	67%	26%	.38***	33%	5%	.39***	73%	24%
12	Watching the world as an outsider	63%	36%	.25***	24%	5%	.29***	69%	11%
13	Having trouble remembering how one got somewhere	37%	14%	.23***	17%	1%	.31***	44%	4%
14	Having trouble remembering details about traumatic event	58%	17%	.38***	43%	11%	.37***	66%	27%
15	Thinking one should remember more about traumatic event	58%	23%	.32***	37%	8%	.35**	61%	24%

Note. The percentage of participants indicating DSPS lifetime and current item endorsement are reported. Endorsement is defined as 'yes'-response for lifetime items, and as frequency ≥ 1 and intensity ≥ 3 for current items. For Study 1, prevalence estimates are reported separately for participants with and without probable lifetime and current PTSD as assessed using the DSM-5 scoring algorithm of the PCL-5 (Bovin et al., 2016). Prevalence estimates were compared between groups using χ^2 with φ describing the effect sizes. Study 2 only included participants with current PTSD as assessed with the CAPS (Weathers, Litz, et al., 2013). Hence, no distinction between participant groups was made. Abbreviations: DSPS = Dissociative Subtype of PTSD Scale; PTSD = Post Traumatic Stress Disorder.

*$p < .05$; **$p < .01$; ***$p < .001$.

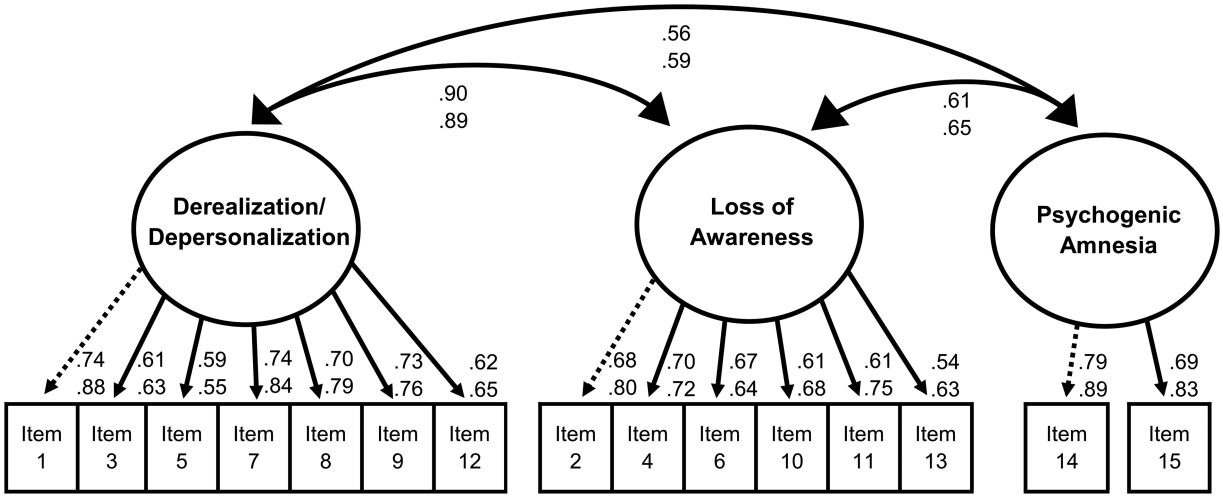

Figure 1. DSPS Factor structure. Standardized loadings of lifetime/ current severity items on their latent factors and correlations between latent factors are presented. Upper values represent associations of lifetime items. Lower values represent associations of current severity items. All associations were significant (*ps* ≤ .001). Pointed lines represent items used to scale the latent factor. For item descriptions see Table 4.

232.84, $p < .001$, CFI = .969, TLI = .963, RMSEA = .055 [.046; .063], SRMR = .042. Similarly, confirmatory factor analysis indicated an acceptable fit of the three-factor structure for current severity items, $\chi 2\ (87) = 201.31$, $p < .001$, CFI = .944, TLI = .933, RMSEA = .073 [.060; .087] and SRMR = .045. All items loaded highly on their respective factor (see Figure 1). Please note that the three-factor structure also demonstrated the best fit when compared to other factor structures (see Supplements).

3.3 Internal consistency

Internal consistency scores of lifetime and current DSPS total scales and subscales are reported in Table 5. Overall, scales demonstrated acceptable to excellent internal consistencies in Study 1 and, except for the lifetime loss of awareness scale (but with .69 close to the margin), acceptable to excellent internal consistencies in Study 2.

Table 5. Internal consistencies of lifetime and current DSPS total scales and subscales.

	Study 1 (*N* = 558)		Study 2 (*N* = 71)	
Scale	Lifetime	Current	Lifetime	Current
Total (15 items)	.90	.92	.85	.86
Derealization/ Depersonalization (7 items)	.85	.88	.79	.81
Loss of Awareness (6 items)	.80	.85	.69	.71
Psychogenic Amnesia (2 items)	.71	.84	.83	.78

Note. Cronbach's alpha for lifetime and current total scales and subscales are reported. Lifetime scales refer to endorsed lifetime items. Current scales refer to current item severity. Cronbach's alpha ≥ .90 are considered excellent, ≥ .80 good, ≥ .70 acceptable, ≥ .60 questionable, ≥ .50 poor and < .50 unacceptable (George & Mallery, 2003).

3.4 Convergent & discriminant validity

Correlations between DSPS subscales and self-report and interview measures of dissociation, PTSD, other psychopathology, and absorption are reported in Tables 6 and 7. As expected, DSPS subscales displayed higher correlations with other measures of dissociation (FDS-20, CAPS-DISS) and measures of

Table 6. Pearson correlations between DSPS and questionnaires.

	DSPS Subscale	FDS-20 current	PCL-5 current	PHQ-9 current	GAD-7 current	SSS-8 current	SSD-12 current	AUDIT current	MPQ-BF
Study 1									
Lifetime	Derealization/Depersonalization	.59*	.50*	.50*	.47*	.44*	.25*	−.13*	.35*
	Loss of Awareness	.63*	.59*	.55*	.51*	.46*	.23*	−.10*	.35*
	Psychogenic Amnesia	.41*	.45*	.42*	.37*	.34*	.15*	−.09	.16*
Current	Derealization/Depersonalization	.73*	.66*	.58*	.52*	.51*	.20*	−.09	.22*
	Loss of Awareness	.75*	.69*	.60*	.54*	.54*	.23*	−.08	.25*
	Psychogenic Amnesia	.48*	.56*	.45*	.37*	.38*	.09*	−.08	.16*
Study 2									
Lifetime	Derealization/Depersonalization	.28*	−.03	−.13	−.16	−.19	−.25	–	–
	Loss of Awareness	.40*	−.08	−.08	−.24	−.23	−.24	–	–
	Psychogenic Amnesia	.12	−.05	−.18	−.17	−.13	−.28*	–	–
Current	Derealization/Depersonalization	.69*	.34*	.16	.07	.26*	.08	–	–
	Loss of Awareness	.63*	.32*	.26	.12	.20*	.09	–	–
	Psychogenic Amnesia	.37*	.18	.16	.03	.08	−.02	–	–

Note. Abbreviations: DSPS = Dissociative Subtype of PTSD Scale; FDS-20 = German shortform of the Dissociative Experiences Questionnaire; PCL-5 = PTSD Checklist for DSM-5; PHQ-9 = Patient Health Questionaire-9; GAD-7 = Generalized Anxiety Disorder Scale-7; SSS-8 = Somatic Symptom Scale-8; SSD-12 = Somatic Symptom Disorder- B Criteria Scale; AUDIT = Alcohol Use Disorder Identification Test; MPQ-BF = Multidimensional Personality Questionnaire-Brief Version, Absorption.
*95% BCa CI not including zero.

Table 7. Point-biserial Pearson correlations between DSPS and clinician-administered interviews.

	DSPS Subscale	CAPS-DIS current	MINI-DEP current	MINI-DEP past	MINI-GAD current
Study 2					
Lifetime	Derealization/ Depersonalization	.37*	−.10	−.01	−.05
	Loss of Awareness	.31*	−.15	.01	−.14
	Psychogenic Amnesia	.17	−.06	.06	−.13
Current	Derealization/ Depersonalization	.45*	.05	.02	−.11
	Loss of Awareness	.43*	.13	−.04	.05
	Psychogenic Amnesia	.18	.08	−.06	−.10

Note. Abbreviations: DSPS = Dissociative Subtype of PTSD Scale; CAPS-DIS current = Dissociative subtype classification via Clinician-Administered PTSD Scale for DSM-5; MINI-DEP current = Current depression classification via Mini-International Neuropsychiatric Interview; MINI-DEP past = Past depression classification via Mini-International Neuropsychiatric Interview; MINI-GAD current = Current generalized anxiety disorder classification via Mini-International Neuropsychiatric Interview.
*95% BCa CI not including zero.

PTSD (PCL-5) and lower correlations with measures of other psychopathology and absorption. This pattern was most pronounced in Study 2, i.e. the PTSD sample.

3.5 Criterion validity

DSPS values did not predict dissociative responding to trauma-related questionnaires in Study 1 (total scale: $b = -.01$, 95% CrI = [−.04; .01]; subscale derealization/depersonalization: $b = -.02$, 95% CrI = [−.07; .03]), which might, however, be due to unsuccessful dissociation induction (overall decrease of dissociation during filling out questionnaires, see Table 2). Yet, DSPS values predicted higher dissociative responding to trauma-script exposure in Study 2 (total scale: $b = 0.09$, 95% CrI = [0.02; 0.16]; subscale: $b = 0.18$, 95% CrI = [0.04; 0.32]), which is illustrated in Figure 2. Additional models with state dissociation at each time point as outcome are reported in the Supplements.

3.6 Ability to identify a latent D-PTSD participant group (Study 1)

3.6.1 Identification of a latent lifetime D-PTSD profile

Four models with two to five latent classes were compared. Based on information criteria displayed in Table S3, a four-class solution demonstrated the best fit. As illustrated in Figure 3, this solution indicated one class with low PTSD and low dissociative symptoms (14%), one class with low-to-medium PTSD and low dissociative symptoms (19%), one class with medium-to-high PTSD and low dissociative symptoms (27%), and one class with high PTSD and high dissociative symptoms (40%).

As detailed in Table S4, the class with high lifetime dissociation and high lifetime PTSD symptoms, i.e. the lifetime D-PTSD class, showed greater lifetime PTSD and dissociative, as well as current

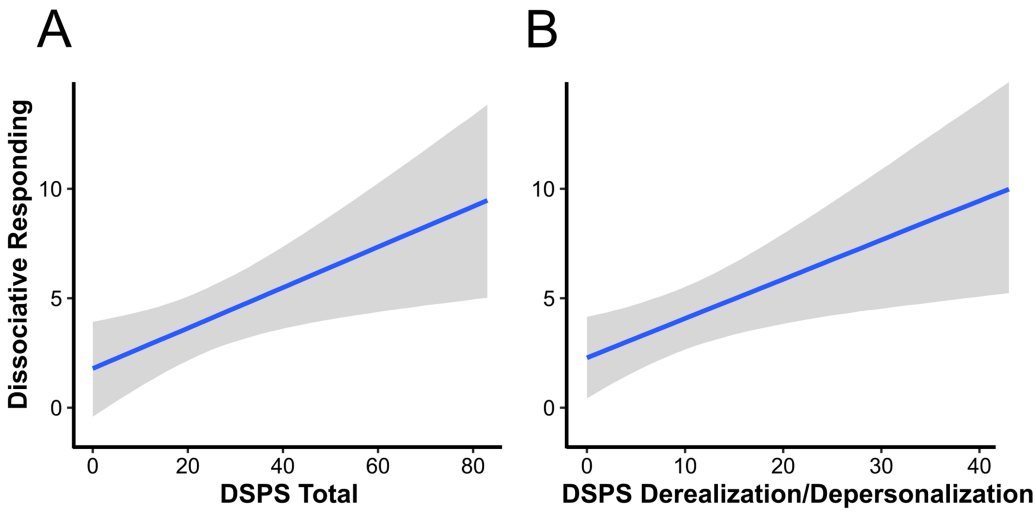

Figure 2. Effects of DSPS scores (A: Total score; B: Derealization/Depersonalization subscale score) on dissociative responding to trauma-script exposure (trauma script minus first neutral script) in Study 2. Fitted values of regression models are displayed. Vertical lines represent 95% CrIs. Abbreviations: DSPS = Dissociative Subtype of PTSD Scale.

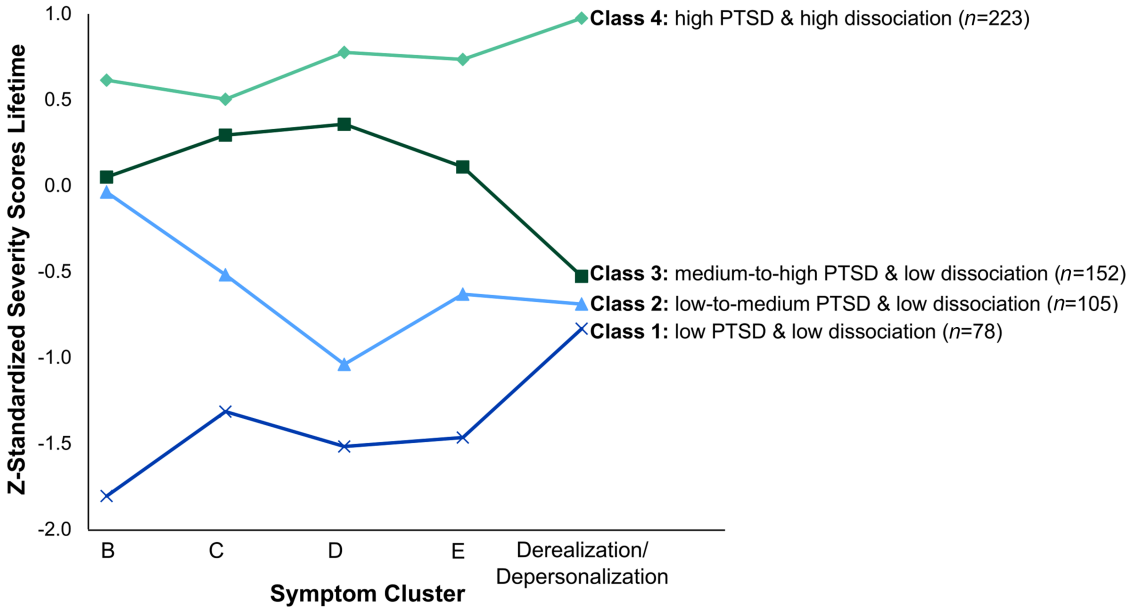

Figure 3. Four-class solution of lifetime latent profile analysis. Mean z-standardized lifetime PCL-5 and lifetime DSPS derealization/depersonalization scores per class are displayed. Abbreviations: PCL-5 = PTSD Checklist for DSM-5; DSPS = Dissociative Subtype of PTSD Scale; B = PCL-5 intrusion symptoms; C = PCL-5 avoidance symptoms; D = PCL-5 negative alterations in cognitions and mood; E = PCL-5 alterations in arousal and reactivity.

depression and anxiety symptoms than any other class. Further, this class was associated with more childhood maltreatment and had a greater proportion of women.

3.6.2 Identification of a latent current D-PTSD profile

Four models with two to five latent classes were compared. Based on information criteria displayed in

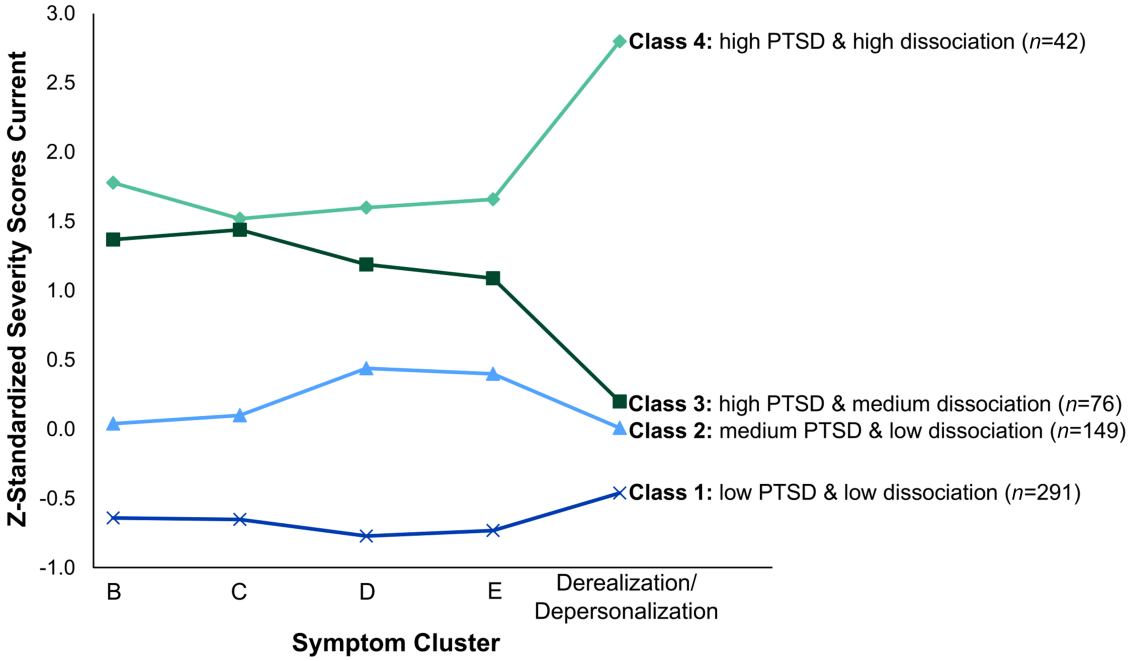

Figure 4. Four-class solution of current latent profile analysis. Mean z-standardized current PCL-5 and current DSPS derealization/depersonalization severity scores per class are displayed. Abbreviations: PCL-5 = PTSD Checklist for DSM-5; DSPS = Dissociative Subtype of PTSD Scale; B = PCL5 intrusion symptoms; C = PCL-5 avoidance symptoms; D = PCL-5 negative alterations in cognitions and mood; E = PCL-5 alterations in arousal and reactivity.

Table S5, a four-class solution demonstrated the best fit. As illustrated in Figure 4, the four-class solution indicated one class with low PTSD and low dissociative symptoms (52%), one with medium PTSD and medium dissociative symptoms (27%), one with high PTSD and medium dissociative symptoms (14%), and one with high PTSD and high dissociative symptoms (8%).

As detailed in Table S6, the class with high current dissociation and high current PTSD symptoms, i.e. the latent D-PTSD group, showed greater current PTSD, current dissociative, as well as depression and anxiety symptoms and was associated with more childhood maltreatment and a greater proportion of women than most classes. However, the class did not differ from the high PTSD and medium dissociation class in childhood physical assault, anxiety symptoms, and proportion of women.

3.7 Ability to identify current D-PTSD diagnosis (Study 2)

To examine the DSPS´s ability to identify current D-PTSD diagnosis, a ROC analysis was conducted based on the number of endorsed current DSPS derealization/depersonalization items in reference to D-PTSD diagnoses (assessed with the CAPS). The ROC analysis demonstrated an AUC of .74 (95% CI = [0.63, 0.85]), illustrated in Figure 5, suggesting that the DSPS is a fair test of D-PTSD (Carter et al., 2016). The ROC suggested an optimal cut-off value of ≥ 1 endorsed current DSPS derealization/depersonalization items (specificity = 74.4%, sensitivity = 65.6%, negative predictive value = 72.5%, positive predictive value = 67.7%, accuracy = 70.4%). For an explorative evaluation of the FDS-20's ability to identify current D-PTSD diagnosis in the present study, see the Supplements.

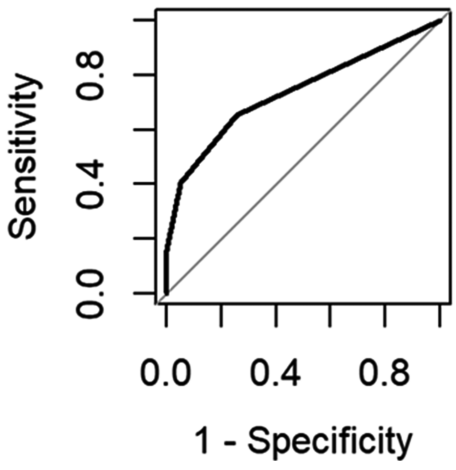

Figure 5. Area Under the Curve for the DSPS derealization/depersonalization subscale. Specificity and sensitivity of a test increase as the ROC curve approaches the upper left corner (x = 0, y = 1). The closer the determined ROC curve is to the diagonal line (random chance line), the less accurate is the test (Carter et al., 2016).

4. Discussion

The current paper examined psychometric properties of the DSPS in trauma-exposed participants with and without PTSD symptoms (Study 1) and trauma-exposed participants with PTSD diagnosis (Study 2). Both samples included broader ranges of age, sex, und trauma types and overall higher levels of psychopathology and dissociation than prior validation samples primarily composed of older male veterans (Guetta et al., 2019; Wolf et al., 2017). Thereby, the present studies allowed to test the generalizability of prior findings. Replicating these, the DSPS demonstrated a three-factor structure and mostly acceptable to excellent internal consistencies of its subscales. Moreover, replicating and extending prior work, the DSPS demonstrated good convergent validity with other self-report and interview measures of dissociation and good divergent validity with self-report and interview measures of other psychopathology and absorption. Moreover, although the DSPS did not predict dissociative responding to trauma-related questionnaires, it did predict higher state dissociation before and during filling out trauma-related questionnaires and dissociative responding to standardized trauma exposure and by these means, for the first time, demonstrated criterion validity. Last, the DSPS was able to identify a latent D-PTSD participant group, and the present study provided first evidence that it might also be a fair test of D-PTSD diagnosis as assessed with a gold-standard diagnostic interview. Altogether, the present findings suggest that the DSPS constitutes a reliable and valid tool to assess the dissociative symptoms of D-PTSD as well as further dissociative symptoms frequently experienced by individuals with PTSD, promoting its use in clinical research and practice. Please note that, in addition to the original English version of the DSPS, the German version of the DSPS employed within the present studies is provided in the Supplements.

The current analyses replicated the DSPS's three-factor structure and the factors' internal consistency. Moreover, exploratory analyses confirmed the superiority of the three-factor solution compared to different two-factor solutions. However, high correlations between factors and a high internal consistency of the total scale in our and previous studies (Guetta et al., 2019; Wolf et al., 2017) might suggest that symptoms of derealization/depersonalization, loss of awareness, and psychogenic amnesia tend to co-occur. Together with other research showing that individuals with D-PTSD do not only display symptoms of

derealization/depersonalization but also other dissociative symptoms (Ross, 2021; Schiavone et al., 2018), these findings might question the definition of D-PTSD solely via derealization/depersonalization and might inform future revisions of diagnostic manuals (Ross, 2021; Schiavone et al., 2018).

Replicating and extending prior work (Guetta et al., 2019; Wolf et al., 2017), the DSPS demonstrated good convergent and divergent validity with self-report and interview measures of dissociation and other constructs in our studies. In Study 1, the DSPS, as expected, displayed high correlations with a self-report measure widely used to assess general dissociative symptoms and a self-report measure of PTSD. Moreover, in line with expectations, the DSPS displayed somewhat lower correlations with self-report measures of other psychopathology (i.e. depression, anxiety, somatic symptom disorder, alcohol use disorder) and absorption. Yet, correlations between the DSPS and measures of depression, anxiety, and somatic symptoms were still of medium to large size, which could suggest a substantial overlap between measures. However, as a substantial body of research has linked dissociative symptoms to higher levels of depression, anxiety, and somatic symptoms (Deen et al., 2022; Hansen et al., 2017; Kratzer et al., 2022; Stein et al., 2013), it might just as well reflect the high comorbidity between these syndromes, which might inflate correlations in samples with varying levels of psychopathology. In line with this notion, correlations between the DSPS and measures of other psychopathology were, as expected, only small to medium in Study 2, i.e. a sample more homogenous in overall psychopathology. Extending prior work (Guetta et al., 2019; Wolf et al., 2017), Study 2 also linked the DSPS to a clinician-administered structured interview constituting the gold standard for assessing D-PTSD (Deen et al., 2022) and did not link the DSPS to interview measures of depression and anxiety. Altogether, these findings provide support for the sensitivity and specificity of the DSPS for dissociative symptoms of D-PTSD and other dissociative symptoms frequently experienced by trauma-survivors. Interestingly, psychogenic amnesia was barely associated with other measures of dissociation in our and prior studies (Guetta et al., 2019). This most likely results from the fact that the other employed measures of dissociation did not include amnesia of the traumatic event in their conceptualization of dissociation, which is, to date, in line with diagnostic criteria of D-PTSD (American Psychiatric Association, 2013).

The present studies were the first to examine DSPS criterion validity, i.e. the ability of DSPS values to predict future dissociative responding to potential triggers of dissociation like trauma-related cues (Vancappel et al., 2022). In Study 1, the DSPS was not able to predict dissociative responding to trauma-related questionnaires, i.e. the change in state dissociation from before the questionnaires to during the questionnaires. However, a closer examination of descriptive changes in state dissociation revealed that dissociation exhibited an overall decrease from before to during the questionnaires (see Table 2) suggesting that these did not successfully provoke dissociative responding. Potentially, the active engagement during filling out questionnaires (e.g. reading, answering, typing) might, similar to therapeutic strategies (e.g. sensory input, speaking, motoric tasks; Schauer & Elbert, 2010), have counteracted dissociative responding. However, the DSPS predicted the level of state dissociation before and during the questionnaires (see Supplemental table S2) which provides at least some support for criterion validity in Study 1. Importantly, the DSPS predicted higher dissociative responding to standardized trauma-exposure in Study 2 suggesting that elevated DSPS scores could index a heightened risk of dissociative responding when encountering trauma-reminders, one of the most commonly reported triggers of dissociation in real life (Vancappel et al., 2022). Exposure to trauma-reminders is an inherent component of efficacious treatments of PTSD like trauma-focused cognitive behavioural therapy or eye movement desensitization and reprocessing (Lewis et al., 2020). As it has been recommended to counteract dissociative responding during treatment components involving reliving the traumatic experience (Schauer & Elbert, 2010), clinical practitioners might evaluate the risk of dissociative responding by administering the DSPS and prepare patients with elevated scores accordingly, i.e. develop and train strategies to counteract dissociative responding.

Replicating the DSPS's ability to identify a latent D-PTSD subgroup (Guetta et al., 2019; Wolf et al., 2017), a cluster of participants with high lifetime PTSD and high lifetime dissociative symptoms (40% of participants) and a cluster with high current PTSD and high current dissociative symptoms (8% of participants) was identified in Study 1. While the lifetime D-PTSD cluster was larger than in previous studies (Wolf et al., 2017) which might result from the overall higher levels of (lifetime) psychopathology and dissociation in our sample, the current latent D-PTSD group size aligned with other studies examining D-PTSD prevalence using latent profile analyses (Guetta et al., 2019; Hansen et al., 2017; White et al., 2022). Moreover, in line with prior work (Hansen et al., 2017; Schiavone et al., 2018), latent D-PTSD subgroups were partly characterized by higher levels of physical and sexual assault and physical neglect in childhood as well as higher levels of depression and anxiety.

Study 2 was the first to assess the DSPS's ability to identify D-PTSD diagnosis. In our sample, the number of endorsed DSPS derealization/depersonalization

items was, with 70.4% correct classifications, a fair test of D-PTSD (Carter et al., 2016). Our analyses suggested that a value of ≥ 1 endorsed symptom(s) is predictive of D-PTSD diagnosis, a cut-off value substantially lower than those predictive of current D-PTSD latent profile membership in a previous study (Guetta et al., 2019). Yet, as a recent meta-analysis has demonstrated tremendous differences in D-PTSD prevalence estimates between studies employing full DSM-5 criteria and studies employing latent profile analyses (White et al., 2022), it is very likely that the results of Guetta et al. (2019) do not generalize to DSM-5 D-PTSD diagnosis. Specifically, applying DSM-5 criteria typically allocates more individuals with PTSD to a D-PTSD subgroup than latent profile analyses (White et al., 2022), which might explain lower DSPS cut-off values for D-PTSD diagnosis than for a latent D-PTSD group. Nevertheless, we cannot rule out that differences between our and previous versions of the DSPS might have influenced cut-off values as well. The present study employed a two-weeks version of the DSPS as opposed to a four-week version in Guetta et al. (2019). Hence it could be that the smaller reference period might have increased the predictiveness of DSPS values for D-PTSD diagnosis in our study. In a similar vein, the present study employed a German version of the DSPS as opposed to the original English version in Guetta et al. (2019). Although a high standard was maintained when translating the questionnaire, we cannot rule out that slight differences in the connotation of the exact wording might have altered the way participants perceived items and response options. However, it is unlikely that the German wording resulted in an overall higher threshold to indicate item endorsement which would explain a lower cut-off value, as, overall, item endorsement was higher in the present studies than in Guetta et al. (2019). Altogether, the present studies provide initial support that the DSPS might be used as screening tool for D-PTSD diagnosis. However, as the cut-off value suggested by our analyses has not yet been cross-validated in an independent sample, it is beyond the scope of the present paper to recommend a certain cut-off value for plausible D-PTSD diagnosis. Instead, we recommend clinicians and researchers to evaluate DSPS scores dimensionally, and, for categorical decisions, have DSM-5 criteria in mind, which would, in line with the cut-off value suggested by our analyses, require the presence of ≥ 1 symptom of depersonalization or derealization for D-PTSD diagnosis.

The high prevalence of D-PTSD together with the frequent observations of other dissociative symptoms in individuals with PTSD in our and previous studies (Ross, 2021; Schiavone et al., 2018; White et al., 2022) questions whether it is adequate to conceptualize experiencing dissociative symptoms as a subtype of PTSD. Instead, it has been proposed that dissociation might be viewed as one of several symptom clusters of PTSD, which may or may not be present, a notion which might inform future revision of PTSD diagnostic criteria (Ross, 2021; White et al., 2022). This may be advantageous, e.g. to better diagnose patients who do not show much hyperarousal or avoidance due to their strong dissociation tendencies when exposed to trauma reminders. In any case, by spanning a broad variety of dissociative symptoms frequently experienced by individuals with PTSD, the DSPS qualifies as an instrument suitable to assess dissociation in individuals with PTSD also in case revised diagnostic criteria may cover a broader range of dissociative phenomena.

4.1 Limitations

The present studies demonstrated good psychometric properties of the DSPS in adults only. To enable a better assessment and treatment of dissociation in trauma-exposed children and adolescents, a population suffering from a high prevalence of dissociative symptoms (White et al., 2022), future studies examining the applicability of the DSPS in children and adolescents are needed. Further, the present Study 2 yielded initial evidence for the DSPS's criterion validity and ability to identify D-PTSD diagnosis, which, however, need to be replicated in other clinical samples. Finally, the present studies did not evaluate test-retest reliability. Therefore, the temporal stability of dissociation symptom assessment is not clear yet.

4.2 Conclusion

The DSPS demonstrated good psychometric properties in two German-speaking samples heterogenous with respect to age, sex, and trauma type and therefore constitutes a promising tool to assess the dissociative symptoms of D-PTSD in clinical research and practice.

Open Scholarship

This article has earned the Center for Open Science badge for Preregistered. The materials are openly accessible at https://doi.org/10.17605/OSF.IO/RKM9V.

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Data availability statement

Data are, in conjunction with an appropriate data sharing agreement, available on request.

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