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How-To Study Dissociative Symptoms in a Broad Range of Mental Disorders: A Methodological Primer

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ABSTRACT

Dissociative symptoms constitute a transdiagnostic phenomenon not only characterizing dissociative disorders but also occurring across a broad range of other mental disorders such as posttraumatic stress disorder or borderline personality disorder. In the latter disorders, dissociative symptoms such as depersonalization, derealization, or gaps in awareness significantly burden patients' wellbeing and functioning. Many efforts have been undertaken to better understand these debilitating symptoms. However, empirical findings have not yet converged in many areas (e.g., considering neurobiological correlates or effects of dissociative psychopathology on treatment outcome), which might partially be due to the heterogeneity and limitations of employed methodology. Here, we critically review the current state-of-the-art methodology in dissociation research, comparing methods to assess dissociative symptoms, provoke dissociative symptoms in the laboratory, select the participant sample, and consider critical sample characteristics. Discussing the informative value and limits of various standard and novel methodological approaches, we aim to provide information and nuanced guidance for future research. By these means, we aim to raise and harmonize standards in dissociation research and enable researchers of all career stages to enter, navigate, and make a significant and lasting contribution to research on dissociative symptoms in a broad range of mental disorders, ultimately contributing to a better understanding of dissociative psychopathology.

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1. Introduction

Dissociation is characterized by alterations in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behavior (American Psychiatric Association, 2013). Dissociative symptoms can be experienced as involuntary intrusions into awareness and behavior, accompanied by disruptions of continuous subjective experience (i.e., positive dissociative symptoms such as identity fragmentation, depersonalization, or derealization) or as inability to access and/or control mental functions (i.e., negative dissociative symptoms such as amnesia; American Psychiatric Association, 2013). Dissociative symptoms are core symptoms in disorders classified as "dissociative disorders" including dissociative identity disorder, dissociative amnesia, or depersonalization-derealization disorder. A great line of research is dedicated to a better understanding of those debilitating disorders (for reviews see Blihar et al., 2020; Dorahy et al., 2014; Kate et al., 2020; Salami et al., 2020; Yang et al., 2023).

The present paper, however, focuses on theories and research on dissociative symptoms when they manifest in other mental disorders such as posttraumatic stress disorder (PTSD) or borderline personality disorder (BPD) (Lyssenko et al., 2018). In these disorders, dissociative symptoms emerge amid several other primary symptoms, which may be influenced by, or may influence, the dissociative symptoms themselves. Further, depending on the exact disorder(s), other dissociative phenomena prevail. For instance, about 50% of individuals with PTSD report dissociative symptoms such as depersonalization, derealization, gaps in awareness, or amnesia (White et al., 2022). In addition, many individuals with PTSD also suffer from dissociative flashbacks of the traumatic experience (American Psychiatric Association, 2013). Similarly, up to 80% of individuals with BPD report dissociative symptoms such as depersonalization, derealization, amnesia, identity confusion, or analgesia (Al-Shamali et al., 2022; Korzekwa et al., 2009; Krause-Utz, 2022). Some authors also distinguish between psychoform and somatoform dissociative symptoms (van Dijke et al., 2015, 2018). Further, individuals with conversion disorder, somatic symptom disorder, substance-related and addictive disorders, feeding and eating disorders, schizophrenia, anxiety disorders, obsessive-compulsive disorder, and most affective disorders also showed heightened levels of dissociative experiences (Lyssenko et al., 2018).

Building upon a long tradition of descriptions, ideas, and theories about dissociative symptoms starting with Janet in the nineteenth century (for an overview see Bob, 2003; van der Hart & Horst, 1989), several current theories on dissociative symptoms might be consulted for deriving theoretical assumptions about dissociative symptoms as well as their potential causes, correlates, and consequences. As the definition of dissociation as an altered state of

Table 1. Prominent theoretical models of trauma/stress-related dissociative symptoms

	Brief description	Assumptions about	Representative publications
Focus on dissociative symptoms common in various clinical populations with trauma history			
Cortico-limbic inhibition model	This model particularly focuses on depersonalization and postulates that it involves increased alertness as well as dampened autonomic arousal and emotions mediated by prefrontal inhibition of limbic regions.	• neural activation • psychophysiology • cognitive symptoms • emotion	Sierra & Berrios, 1998
Defense-cascade models	This group of theories conceptualize dissociation as part of an automatically activated, biologically grounded set of defense-responses to threats. They propose an inverted U-shaped association between dissociation and physiological arousal/ negative emotions.	• evolutionary function • etiology • neural activation • psychophysiology • perception • cognition • emotion • behavior	Kozlowska et al., 2015; Lanius et al., 2018; Mobbs et al., 2009; Schauer & Elbert, 2010
Emotion modulation model (can be integrated within the larger framework of defense-cascade models)	This model conceptualizes dissociation as a form of emotion dysregulation involving emotional overmodulation mediated by prefrontal inhibition of limbic regions.	• neural activation • emotion	Lanius et al., 2010, 2012
4-D-model	This model classifies PTSD symptoms into those occurring within normal consciousness and those linked to altered states of consciousness, i.e., dissociation.	• (co-)occurrence of dissociative and other PTSD symptoms • etiology	Frewen & Lanius, 2014
Triple network model	This model hypothesizes patterns of functional connectivity in depersonalization/ derealization, dissociative intrusions, and dissociative identity disorder.	• neural activation	Lebois et al., 2022
Cognitive behavioral model	This model understands dissociation as a product of associative conditioning and deduces potential interventions.	• etiology • cognitive processes • emotion • behavior	Vancappel & El-Hage, 2023
Broader focus or focus on structural forms of dissociation			
BASK model of dissociation	This model illustrates how dissociation can interrupt consciousness within four dimensions normally congruent across a space/ time continuum (behavior, affect, sensation, knowledge) and suggests respective treatment options	• cognitive processes • emotion • behavior	Braun, 1988

(*Continued*)

Table 1. (Continued).

	Brief description	Assumptions about	Representative publications
The domain of dissociation model	This model describes three main domains of dissociation as (i) nonconscious or nonintegrated mental modules or systems, (ii) an alteration in consciousness including disconnection from self or environment, or (iii) as defense mechanism.	• evolutionary function • cognitive processes	Cardeña, 1994
Compartmentalization-detachment/ bipartite model of dissociation	This model distinguishes between dissociative symptoms in normal (detachment) and more severe, trauma-related (compartmentalization) aspects	• cognitive processes • emotion • behavior	Brown, 2006; Holmes et al., 2005
The theory of structural dissociation of the personality	This theory categorizes trauma-related structural dissociation along three severity stages (primary dissociation characterizing simple PTSD, secondary dissociation characterizing complex PTSD and dissociative disorder not otherwise specified (DDNOS), and tertiary dissociation characterizing dissociative identity disorder). At all stages, at least two structurally distinct personality parts/agents (emotional part of personality - ENP, apparently normal part of personality - ANP) are assumed which may be dissociative in multiple ways (by constituting dissociative agents and by experiencing dissociative phenomena, e.g., depersonalization).	• evolutionary function • psychophysiology • cognition • emotion	Nijenhuis et al., 2010; Nijenhuis & van der Hart, 2011

consciousness taps into the question of what defines consciousness (Thompson & Zahavi, 2007), there are many levels on which theories can be located. Here, we give a short overview of prominent current theories conceptualizing dissociative symptoms as a consequence of stress and/or trauma exposure in Table 1. We strongly encourage researchers interested in studying dissociative symptoms to first familiarize themselves with existing theories on the dissociative phenomena of their scientific interest. Drawing from these theories, prior empirical findings, and their clinical experience, they can then formulate empirically testable hypotheses.

A variety of meta-analytical and systematic reviews have been published in the past decades summarizing the current state of evidence on dissociative

symptoms in a broad range of mental disorders and their neurobiological (Lotfinia et al., 2020; Roydeva & Reinders, 2021), autonomic (Beutler et al., 2022; Boulet et al., 2022; Roydeva & Reinders, 2021), and genetic (Roydeva & Reinders, 2021) correlates as well as associations with treatment outcome (Hoeboer et al., 2020) and emotion regulation (Cavicchioli et al., 2021). However, the summarized literature reflects little convergence, for instance, regarding the extracted biomarkers of pathological dissociative symptoms. On a neurobiological level, most structural and functional aberrations were found in the frontal lobes and tentative support exists for divergent activation patterns between individuals diagnosed with dissociative identity disorder and/or dissociative PTSD and individuals diagnosed with depersonalization/derealization disorder (Blihar et al., 2020; Lotfinia et al., 2020; Roydeva & Reinders, 2021). However, across studies, there is insufficient empirical evidence that pathological dissociative symptoms are linked to limbic hypoactivation, especially with regard to the amygdala. Autonomic measurements (e.g., heart rate or blood pressure) are also inconsistent to date; no robust evidence exists yet supportive of the hypothesis that dissociative symptoms are associated with a blunted physiological response to (traumatic) stressors. These inconsistencies may be partially explained by the heterogeneity of prior work regarding examined disorders and dissociative phenomena, methodological limitations as well as statistical power issues (Beutler et al., 2022; Boulet et al., 2022; Roydeva & Reinders, 2021).

Consequently, reviews and meta-analyses highlight the need to raise and harmonize standards in research on dissociative symptoms in various mental disorders. The current methodological primer aims to assist researchers in doing so. First of all, it might be unrealistic to expect convergence of empirical findings for the rather wide group of different dissociative phenomena. It has therefore been recommended, especially in biomarker research, to focus on and differentiate between specific symptoms (e.g., derealization) and thoroughly choose suitable measures of dissociative symptoms (Roydeva & Reinders, 2021). Authors across reviews also noted that the distinction made between state and trait dissociation is useful; future researchers are encouraged to assess both within their study designs to disentangle their overlapping and discrete (biological) correlates (Beutler et al., 2022; Sar & Ross, 2023). Reviews and meta-analyses further recognize the need for more rigorous diagnostic approaches, combining interview-based assessments with questionnaires to mitigate false positives and false negatives (Blihar et al., 2020). **To assist researchers in selecting suitable dissociation measures covering the dissociative phenomena of interest, we give an overview of common dissociation measures and important decision criteria in** *Section 2*. As most existing research is observational, reviews further call for the use of experimental manipulation techniques to induce or inhibit a dissociative response in the laboratory

(Beutler et al., 2022; Lotfinia et al., 2020). **To help researchers select and employ dissociation induction methods suitable for their research questions, we review and compare established and novel methods in** *Section 3*. Further, reviews have noted that limited generalizability of existing data (e.g., predominantly female samples) might call for more heterogeneous participant sampling, while specificity concerns emphasize the need to control for confounding factors for instance by examining homogeneous (sub-)samples (Beutler et al., 2022; Roydeva & Reinders, 2021). **Hence, we dedicate *Section 4* to providing guidance in considering critical sample characteristics**. By these means, the current methodological primer might help researchers address the limitations and considerations identified by meta-analyses and systematic reviews, which are paramount for advancing our understanding of trauma-related dissociative symptoms.

2. Assessing dissociative symptoms

An important challenge in dissociation research is to choose measures of dissociative symptoms suitable for one's research question. To establish diagnoses (for instance to check in- or exclusion criteria or to determine group membership), one might use a combination of diagnostic interviews and self-report measures. To (repeatedly) assess the severity of chronic dissociative symptoms or acute state dissociation, self-report measures might be particularly suitable.

Diagnostic interviews

The Structured Clinical Interview for DSM-IV Dissociative Disorders (SCID-D; Steinberg, 1993, 1994) was the first interview developed to assess dissociative symptoms (i.e., amnesia, depersonalization, derealization, identity confusion, identity alteration) and establish DSM-IV diagnoses of dissociative disorders (American Psychiatric Association, 1994). A novel alternative to the SCID-D is the Trauma and Dissociation Symptoms Interview (TADS-I; Boon, 2023) capturing various facets of pathological dissociation as conceptualized in the ICD-11 (World Health Organization, 2019). To assess symptoms of and diagnose the DSM-5 dissociative subtype of PTSD (American Psychiatric Association, 2013), one might use the Clinician Administered PTSD Scale for DSM-5 (CAPS; Weathers et al., 2013a, 2018) or the dissociative subtype of PTSD interview (DSP-I; Eidhof et al., 2019). Further, to assess acute dissociative symptoms (i.e., depersonalization, derealization, amnesia) in healthy and clinical samples (e.g., PTSD, dissociative disorders, affective disorders), one might employ the Clinician-Administered Dissociative States Scale (CADSS; Bremner et al., 1998) administering 27 items (19 subject-rated, 8 observer-rated) in interview form on a Likert-scale from 0 (not at

all) to 4 (extremely). A revised version (Bremner, 2014; Mertens & Daniels, 2022) includes four new subject-rated items and removed several observer items, resulting in a 28-item scale containing 23 subject-rated and five observer-rated items. Further, a brief version (CADSS-6; Rodrigues et al., 2021) includes six items most sensitive to ketamine-induced dissociative symptoms in individuals with treatment-resistant depression. Finally, to assess the severity of physical alterations assumed to accompany trauma-related dissociative symptoms based on defense cascade models, one might use the Shutdown Dissociation Scale (Shut-D; Schalinski et al., 2015).

Self-report measures

When choosing dissociation self-report measures, one needs to consider several factors: (1) the **dissociative phenomena** of interest (e.g., depersonalization, derealization, gaps in awareness); (2) the **sample** of interest (e.g., healthy individuals, individuals with certain disorder(s)); (3) the **time period** during which one wants to assess dissociative symptoms (e.g., trait dissociation/overall dissociation proneness, dissociative symptoms across several days/weeks, acute dissociation); and (4) the **quantitative aspects of dissociation** one wants to investigate (e.g., frequency of the dissociative experience and/or intensity of dissociation). Further, studies examining acute dissociation might also consider (5) the **paradigm employed to elicit dissociative symptoms** and (6) the **task during which the acute dissociation level is assessed** (which may or may not overlap with the provocation paradigm). Importantly, these factors are closely interweaved with one another and need to be considered together, making the choice of measure a complex decision. While different research questions hence warrant different measures and no general recommendations can be given for or against certain measures, we deem it crucial to make an informed decision when selecting dissociation measures. Therefore, one needs to carefully determine one's needs regarding the reviewed decision criteria, eventually prioritize between them, and check eligible measures. To facilitate this process, common self-report measures of dissociative symptoms are described in Table 2 considering the reviewed criteria. Upon identifying one or several candidate measures based on these practical criteria, a further important step is to check the psychometrics of the respective measure and the availability of a validated version in the study language (for a first attempt to facilitate this final step, please refer to Wainipitapong et al., 2025).

For instance, imagine planning a study assessing the effectiveness of a novel 3-months treatment for dissociative symptoms in individuals with PTSD and/or BPD (*sample*). Your intervention particularly addresses gaps in awareness, which you therefore consider your primary outcome, yet you would also be interested in the effects of other dissociative

Table 2. Common self-report measures of dissociative symptoms

Measure	Dissociative phenomena and corresponding subscales	Format	Time period	Quantitative aspects	Commonly used for	Other versions
Dissociative symptoms during an undefined time period (often referred to as trait dissociation/ dissociation proneness)						
Dissociative Experiences Scale (DES) (E. M. Bernstein & Putnam, 1986)	Pathological and nonpathological dissociative experiences in daily life; 3 subscales, including absorption/imaginative involvement, amnesia, depersonalization/derealization	28 items, Visual Analogue Scale from 0% (never) to 100% (always)	None	Frequency	Assessing tendencies to dissociate in community and clinical samples	• DES-II (Carlson & Putnam, 1993) – Response format changed to a 11-point Likert scale from 0% to 100% of time • DES-Revised (DES-R; Dalenberg et al., 1994) – Response format changed to an 8-point Likert scale from "never" to "daily or more often" • DES-Comparison (DES-C; Wright & Loftus, 1999) – response format changed to a 11-point Likert scale from "much less than others" to "much more than others" • DES-Taxon (DES-T; Waller & Ross, 1997) – 8-item version capturing pathological dissociation only • FDS-20 (Spitzer et al., 2004) – brief German 20-item version including items with highest discriminatory power, adapted instruction referring to the last 14 days, same response format as original

(*Continued*)

Table 2. (Continued).

Measure	Dissociative phenomena and corresponding subscales	Format	Time period	Quantitative aspects	Commonly used for	Other versions
Multidimensional Inventory of Dissociation (MID; Dell, 2006)	Pathological dissociative experiences; 12 dissociation factors, including self-confusion, angry intrusions, dissociative disorientation, amnesia, distress about memory problems, subjective experience of the presence of alternate personalities, derealization/ depersonalization, persecutory intrusions, trance, flashbacks, body symptoms, circumscribed loss of remote autobiographical memory; 6 validity scales, including defensiveness, emotional suffering, rare symptoms, attention-seeking behavior, factitious behavior, severe borderline personality disorder index	218 items (168 dissociation items and 50 validity items), Likert scale from 0 (never) to 10 (always)	None	Frequency	Comprehensively assessing the entire domain of dissociative phenomena	• Adult version: 7th grade (US) or higher reading comprehension level • Adolescent version: less formal language, some items modified to be more age-congruent
Trait Dissociation Questionnaire (Murray, 1997)	Dissociative experiences; seven subscales, including detachment from others and world, sense of split self, lability of mood and impulsivity, inattention and memory lapses, emotional numbing, confusion and altered time sense, amnesia for important life events	38 items, Likert scale from 0 (never) to 5 (always)	None	Frequency	Assessing pre-traumatic disposition for dissociative experiences	• TDQ-s (Murray et al., 2002) – brief 10-item version

(*Continued*)

Table 2. (Continued).

Measure	Dissociative phenomena and corresponding subscales	Format	Time period	Quantitative aspects	Commonly used for	Other versions
Dissociative symptoms during a time period of weeks/months (also often referred to as dissociative symptom severity)						
Cambridge Depersonalisation Scale (CDS; Sierra & Berrios, 2000)	Depersonalization	29 items, Frequency ratings on a Likert scale from 0 (never) to 4 (all the time), duration ratings on a Likert scale from 1 (few seconds) to 6 (more than a week)	Past six months	Frequency and Duration	Individuals with depersonalization disorder	• CDS-2 (Michal et al., 2010) – brief 2-item version with the two items discriminating best between individuals with and without depersonalization disorder
Černis Felt Sense of Anomaly Scale (ČEFSA; Černis et al., 2021)	Dissociative symptoms with a felt sense of anomaly as core feature occurring across a broad range of mental health disorders; 7 subscales including anomalous experiences of the self, body, and emotion, altered senses of familiarity, connection, agency, and reality. Compartmentalization, detachment, derealization, and depersonalization included as combination of different domains.	35 items, Likert scale from 0 (never) to 4 (always)	Past two weeks	Frequency	Assessing dissociative symptoms in non-clinical individuals (including those with trauma symptoms) and individuals with psychosis	ČEFSA-14 (Černis et al., 2024) – brief 14-item version
Dissociative Symptoms Scale (DSS[a]; Carlson et al., 2018)	Dissociative symptoms relevant to several clinical populations, including those with trauma-related dissociation; 4 subscales, including depersonalization/ derealization, gaps in awareness and memory, sensory misperceptions, dissociative reexperiencing	20 items, Likert scale from 0 (not at all) to 4 (more than once a day)	Past week	Frequency	Assessing dissociative symptoms in different clinical populations including those with trauma-related dissociation	• DSS-Brief Form (DSS-B; Macia et al., 2023) – brief 8-item version

(*Continued*)

Table 2. (Continued).

Measure	Dissociative phenomena and corresponding subscales	Format	Time period	Quantitative aspects	Commonly used for	Other versions
Dissociation Tension Scale (German: Dissoziations-Spannungs-Skala; DSS[a]; Stiglmayr et al., 2010)	Dissociative symptoms (ranging from normal up to pathological) and inner tension; Psychological dissociation: derealization, depersonalization, amnesia, absorption, pseudo-hallucinatory experience; somatoform dissociation: immobility, optical and acoustical changes, changes in language generation; no subscales	22 items (21 dissociation, 1 tension), Likert scale from 0% (never) to 100% (constantly)	Past week	Frequency	Assessing dissociative symptoms in individuals with borderline personality disorder	• For state versions (DSS-acute, DSS-4) see below
Dissociative Subtype of PTSD Scale (DSPS; Guetta et al., 2019; Wolf et al., 2017)	Dissociative symptoms frequently experienced by trauma survivors, including those defining the dissociative subtype of PTSD according to the DSM-5; 3 subscales, including depersonalization/derealization, loss of awareness, psychogenic amnesia	15 items, lifetime prevalence rated as yes/no, frequency in the past month rated on a Likert scale from 0 (never) to 4 (daily); intensity in the past month rated on a Likert scale from 0 (not applying) to 5 (extremely strong);	Life-time + Past month	Frequency, Intensity, Severity (combination of frequency and intensity)	Assessing dissociative symptoms in trauma-survivors with and without PTSD, screening for D-PTSD diagnosis, identifying individuals at risk for dissociative responding to trauma-focused treatment	• Version covering lifetime + past 2 weeks (Danböck, Hettegger, et al., 2023) to facilitate the detection of treatment effects
Multiscale Dissociation Inventory (MDI; Briere, 2002)	Level of dissociative disturbances; 6 subscales, including disengagement, depersonalization, derealization, emotional constriction/numbing, memory disturbance, identity dissociation	30 items, Likert scale from 1 (never) to 5 (very often)	Past month	Frequency	Assessing dissociative dimensions in clinical, community, and university samples	None

(*Continued*)

Table 2. (Continued).

Measure	Dissociative phenomena and corresponding subscales	Format	Time period	Quantitative aspects	Commonly used for	Other versions
Somatoform Dissociation Questionnaire (SDQ-20; Nijenhuis et al., 1996)	Somatoform dissociative symptoms which had appeared upon reactivation of dissociative personality parts in clinical populations and could not be medically explained; Positive symptoms (e.g., pain perception without painful stimulus) and negative symptoms (e.g., loss or reduction of perception); no subscales	20 items, Likert scale from 1 (this applies to me NOT AT ALL) to 5 (this applies to me EXTREMELY)	Past year	Severity (some items refer to frequency and/or intensity)	Assessing somatoform indicators of structural dissociation/ screening for dissociative disorders in clinical samples	• SDQ-5 (Nijenhuis, 2010) – brief 5-item screener • SDQ-P (Nijenhuis et al., 2001) – 11-item version for peritraumatic dissociation
Dissociative symptoms during a time period of seconds/minutes (often referred to as state dissociation or acute dissociation)						
Dissociation Tension Scale-acute (DSS-acute; Stiglmayr et al., 2003)	Acute dissociative symptoms (ranging from normal up to pathological) and inner tension; Psychological dissociation: derealization, depersonalization, amnesia, absorption, pseudo-hallucinatory experience; somatoform dissociation: immobility, optical and acoustical changes, changes in language generation	22 items (21 dissociation, 1 tension), Likert- scale from 0 (none) to 9 (very strong)	State	Intensity	Assessing acute dissociation in healthy and clinical samples (e.g., borderline, depression, panic disorder)	• DSS-4 (Stiglmayr et al., 2009) – short 4-item state version including pathological symptoms only (depersonalization, derealization, somatoform dissociation, analgesia) and only items compatible with neuroimaging settings (e.g., no questions about difficulties coordinating movements) • For the version covering a week (DSS) see above

(*Continued*)

Table 2. (Continued).

Measure	Dissociative phenomena and corresponding subscales	Format	Time period	Quantitative aspects	Commonly used for	Other versions
Peritraumatic Dissociative Experiences Questionnaire (PDEQ; Marmar et al., 1997)	Dissociative symptoms: derealization, depersonalization, altered time sense, amnesia, out of body experience	10 items; Likert-scale from 0 (not at all) to 4 (extremely)	State	Intensity	Assessing state dissociation during a traumatic event or a trauma analogue (e.g., trauma film) in healthy or clinical samples; also used to assess state dissociation during symptom provocation	• Versions adapted for trauma film studies (Danböck et al., 2021; Kindt et al., 2005) – excluding items not appropriate for film paradigms • Modified PDEQ/ RAND PDEQ (Marshall et al., 2002) – 8-item version adapted for persons from diverse sociocultural and economic back-grounds
Response to Script-driven Imagery Scale, Subscale dissociation (RSDI; Hopper, Frewen, Sack, et al., 2007)	Dissociative and PTSD symptoms; three subscales, including dissociation (depersonalization, derealization), avoidance, re-experiencing	11 items, including 4 dissociation items, 4 re-experiencing items, 3 avoidance items, Likert-scale from 0 (not at all) to 6 (a great deal)	State	Intensity	Assessing acute dissociation during symptom provocation (e.g., via script-driven imagery) in clinical samples (e.g., PTSD, borderline)	None
State Scale of Dissociation (Krüger & Mace, 2002)	Changes in and the severity of acute dissociative symptoms; 7 subscales including derealization, depersonalization, identity confusion, identity alteration, conversion, amnesia and hypermnesia	56 items	State	Intensity	Assessing correlations between changes in dissociative states and concurrent physiological parameters	None

[a]Please note that there exist two independent dissociation scales using the same acronym "DSS"

phenomena common in the target group (*phenomena*). You might want to employ a measure assessing dissociative symptoms in a period long enough to reflect a somewhat persistent psychopathology level but also short enough to be able to capture change over time. Hence, you take measures assessing dissociative symptom severity, preferably for a rather short number of weeks, into further consideration (*time period*). Among the measures summarized in Table 2, both the Dissociative Symptoms Scale (DSS; Carlson et al., 2018) and the Dissociative Subtype of PTSD Scale (DSPS; Wolf et al., 2017) meet your primary requirements, however, they cover different additional dissociative phenomena, and you might have preferences for one or the other based on theoretical assumptions about your intervention and expected prevalence of those phenomena in your sample. Finally, you might also want to consider which kind of symptom alleviation your intervention aims to achieve. If you aim to achieve and assess effects on the frequency of dissociative symptom occurrence, you can use both, the DSPS and the DSS. Yet, if you also want to weigh in symptom intensity, you might prefer to use the DSPS.

As another example, imagine planning a study on neural alterations during acute depersonalization and derealization (*time period, phenomena*) in individuals with PTSD (*sample*). You want to provoke dissociative symptoms using script-driven imagery during neuroimaging and repeatedly assess acute dissociation intensity during the session which is why you are looking for a brief measure (*paradigm*). According to Table 2, both the Dissociation subscale of the Responses to Script-Driven Imagery Scale (RSDI; Hopper, Frewen, Sack, et al., 2007) and the 4-item version of the German Dissoziations-Spannung-Skala (Dissociation Tension Scale-4; DSS-4; Stiglmayr et al., 2009) might suit your purposes. Taking a closer look at these measures, the RSDI has been developed specifically for script-driven imagery, while the DSS-4 has been tailored to neuroimaging settings. While the RSDI assesses depersonalization and derealization with two items each, the DSS-4 assesses depersonalization, derealization, somatoform dissociation, and analgesia with one item each. Hence, you need to weigh in more detailed depersonalization/derealization assessment vs. an additional assessment of other dissociative symptoms and prioritize one approach or the other.

3. Provoking dissociative symptoms in the laboratory

To gain more insight into acute dissociative symptoms, it is essential to experimentally elicit acute dissociative states in the laboratory via so-called symptom provocation paradigms (see Table 3 for an overview and Table S1 for further details). Thereby, dissociative symptoms are provoked which are intensity-wise weaker or comparable to those regularly

experienced by the study participants in real-life. Experimental dissociation induction methods differ greatly from one another, and some might be more and others less suitable for specific research questions. Hence, it is important to carefully reflect upon the choice of strategy when planning a new study and tailor it to the primary research question.

Aversive stimulation

A classic way to induce dissociative symptoms is via aversive stimulation. Specifically, participants can be exposed to aversive film clips (e.g., Chou et al., 2014; Danböck et al., 2021; Danböck, Franke, et al., 2023; Holmes et al., 2004, 2006), aversive audios (e.g., narratives of shameful autobiographic memories; Kouri et al., 2023) or painful stimulation such as electrical stimulation (Danböck, Franke, et al., 2023) or holding their arm in ice water (e.g., Giesbrecht et al., 2008; Gómez-Pérez et al., 2013; Horowitz & Telch, 2007). Further, individuals with trauma history can also be exposed to trauma reminders to evoke dissociative symptoms, using paradigms such as script-driven imagery (e.g., Danböck, Liedlgruber, et al., 2024; Hopper, Frewen, van der Kolk, et al., 2007; Krause-Utz et al., 2018, 2021; Mertens et al., 2022; Sack et al., 2012; Winter et al., 2015). During script-driven imagery, participants recall and vividly imagine a prior personal traumatic experience, while listening to an auditive narrative of the situation. The degree to which those narratives are standardized within and across participants varies between studies, ranging from a standardization of event type, duration, and writing style (e.g., present tense, second person, if possible in participant's words; Sack et al., 2012) to paradigms in which also the content of narratives is highly standardized (e.g., fixed minimum number of thoughts, emotions, perceptions, etc.; Danböck, Liedlgruber, et al., 2024). Further, some studies have participants talk about their traumatic event (Griffin et al., 1997). Importantly, aversive film clips, painful stimulation, and trauma-reminders not only induce dissociative symptoms but also a variety of other stress responses including negative subjective experiences, autonomic and neural alterations, and behavioral changes (for reviews see for instance James et al., 2016; Pole, 2007). Therefore, they might be understood as **unspecific strategies** to induce dissociative symptoms. However, these strategies closely resemble real-life triggers of dissociative symptoms described by individuals with D-PTSD (Vancappel et al., 2022), emphasizing their **ecological validity**. These strategies might thus be particularly suited for studies aiming to observe correlations between dissociative symptoms and other constructs but are less fit to answer questions about causal effects on one another.

Strategies targeting perception

Another approach to elicit dissociative symptoms in the laboratory is via approaches which can be loosely summarized as strategies targeting perception. For instance, one can ask participants to stare at a dot (Leonard et al., 1999; Lickel et al., 2008; Miller et al., 1994), at a rotating spiral (Danböck et al., 2025; Dorahy et al., 2016; Lickel et al., 2008), at their own face or body in a mirror (Borgmann et al., 2014; Caputo, 2010; Dorahy et al., 2016; Miller et al., 1994; Schäflein et al., 2018; Shin et al., 2019), or at another person's face (Caputo, 2015). Further, one might also expose participants to pulsed audio-photic stimulation, i.e., a ticking metronome sound combined with pulsing light (Leonard et al., 1999; but see Danböck et al., 2025, for an unsuccessful replication), or stimulus-deprive them (Leonard et al., 1999). Furthermore, one might use vision-deforming glasses (Renard et al., 2018) or simulate an out-of-body experience via virtual reality (van Heugten - van der Kloet et al., 2018). Finally, one might also hypnotically induce dissociative states (Danböck et al., 2025; Hagenaars et al., 2008; Holmes et al., 2006). Overall, strategies targeting perception differ greatly from one another, with only few studies directly comparing different strategies to one another regarding dissociation intensity (Danböck et al., 2025; Dorahy et al., 2016; Leonard et al., 1999; Miller et al., 1994), one study comparing dissociation quality (Danböck et al., 2025), and no study comparing or even examining perceptual mechanisms at play. Hence, it is beyond the scope of the current work to pinpoint the advantages and disadvantages of specific strategies. However, some of these strategies might constitute promising tools for a **more selective manipulation of dissociative symptoms** (as compared to strategies working via aversive stimulation) which might enable the examination of **causal effects** of induced dissociative symptoms on other (not automatically co-manipulated) constructs such as negative affect, physiological and behavioral alterations. Yet, thereby it might be crucial to consider the **fit between the research question, dissociation induction strategy, and sample**, which can be illustrated in the example of mirror-staring: When mirror-staring, a presumable unemotional dissociation induction strategy, was employed in healthy individuals to investigate causal effects of a dissociation manipulation on emotional responses to affective pictures, it successfully induced dissociative symptoms with no differences in negative affect (Shin et al., 2019). Consequently, the authors were able to examine causal effects of dissociation manipulation on emotional responses to affective pictures. However, when mirror-staring was employed in individuals diagnosed with dissociative disorders (Schäflein et al., 2018) or individuals with PTSD (Borgmann et al., 2014), the task itself was perceived as distressing, which might be explained by the fact

that prolonged self-perception of one's face or body might function as trauma-reminder in these populations. Hence, while mirror-staring might be a suitable paradigm to study causal effects of dissociative symptoms on emotions in healthy individuals, it might not be suitable to examine causal effects of dissociative symptoms on emotions in individuals with trauma history. In this context, it might rather be understood and used as a paradigm evoking unspecific, but naturalistic stress responses which can be studied correlatively.

Strategies targeting physiological arousal

Dissociative symptoms might also be elicited via physical strategies targeting physiological arousal. A first study thereby elicited dissociative symptoms via hyperventilation (Lickel et al., 2008). Strategies supposedly working via physiological arousal could, for instance, enable researchers to study causal effects of physiological arousal on dissociative states.

Pharmacological agents

Finally, studies have demonstrated dissociative effects of various pharmacological agents including N-methyl-D-aspartate receptor (NMDAR) antagonists such as ketamine (Danböck, Duek, et al., 2024; Dehestani et al., 2022; Duek et al., 2019; Krystal, 1994; Niciu et al., 2018; Short et al., 2018) or nitrous oxide ("laughing gas;" Piazza et al., 2022), 3,4-Methylenedioxymethamphetamine (MDMA; van Heugten Van der Kloet et al., 2015), cannabis (van Heugten - van der Kloet et al., 2015) and the opioid receptor agonist salvia divinorum (Addy et al., 2015). Another study tried to use reboxetine to increase amygdala reactivity and thereby elicit dissociative symptoms, which was, however, not successful (Mertens et al., 2023). To better understand which pharmacologically induced dissociative states are comparable to dissociative states spontaneously emerging in individuals with trauma-history, first studies have started to compare subjective qualities of ketamine/opioid-induced and naturally occurring dissociative symptoms. While first findings indicate that dissociative states induced by ketamine and other NMDAR antagonists psychometrically resemble dissociative symptoms experienced by trauma survivors (Niciu et al., 2018; Piazza et al., 2022), similar investigations on other agents are still lacking.

Table 3. Methods to induce dissociative symptoms in the laboratory

Method	Example studies	Sample(s)	Employed measure(s) to assess induced dissociative symptoms[a]
Aversive stimulation			
Aversive film clips	Chou et al., 2014; Danböck et al., 2021; Danböck, Franke, et al., 2023; Holmes et al., 2004, 2006	Healthy adults	CADSS, PDEQ, DSS-4, visual analogue scales
Aversive audios	Kouri et al., 2023	Trauma-exposed women	MDI[b]
Painful electrical or thermal stimulation	Danböck, Franke, et al., 2023; Giesbrecht et al., 2008; Gómez-Pérez et al., 2013; Horowitz & Telch, 2007	Healthy adults	DSS-4, M-PDEQ, ADI
Exposure to trauma reminders (script-driven imagery, talking about the event)	Danböck, Liedlgruber, et al., 2024; Griffin et al., 1997; Hopper, Frewen, van der Kolk, et al., 2007; Krause-Utz et al., 2018; Mertens et al., 2022; Sack et al., 2012; Winter et al., 2015	Healthy adults, adults with PTSD or BPD	RSDI, DSS-4, CADSS, PDEQ
Strategies targeting perception			
Dot-staring	Leonard et al., 1999; Lickel et al., 2008; Miller et al., 1994	Healthy adolescents and adults, adults with panic disorder	ADI, DDQ, verbal depersonalization/derealization ratings
Spiral-staring	Danböck et al., 2025; Dorahy et al., 2016; Lickel et al., 2008	Healthy adolescents and adults	PDEQ, M-PDEQ, verbal depersonalization/derealization ratings
Mirror-staring	Borgmann et al., 2014; Caputo, 2010; Dorahy et al., 2016; Miller et al., 1994; Schäflein et al., 2018; Shin et al., 2019	Healthy adults, adults with PTSD, panic disorder, or dissociative disorders	DSS-4, M-PDEQ, DDQ, RSDI, CADSS, open description
Staring at another person's face	Caputo, 2015	Healthy adults	CADSS
Stimulus deprivation	Leonard et al., 1999	Healthy adolescents and adults	ADI
Pulsed audio-photic stimulation	Danböck et al., 2025 (unsuccessful); Leonard et al., 1999	Healthy adolescents and adults	ADI, PDEQ
Vision-deforming glasses	Renard et al., 2018	Healthy adults	CADSS
Virtual reality	van Heugten - van der Kloet et al., 2018	Healthy adults	CADSS
Hypnotic suggestion	Danböck et al., 2025; Hagenaars et al., 2008; Holmes et al., 2006	Healthy adults	PDEQ, CADSS, SDQ, visual depersonalization/derealization analog scales
Strategies targeting physiological arousal			
Hyperventilation	Lickel et al., 2008	Healthy adolescents and adults	Verbal depersonalization/derealization ratings
Pharmacological agents			
NMDAR antagonists (ketamine, nitrous oxide)	Danböck, Duek, et al., 2024; Krystal, 1994; Niciu et al., 2018; Piazza et al., 2022	Healthy adults, adults with treatment-resistant depression, bipolar disorder, or PTSD	CADSS
MDMA	van Heugten - van der Kloet et al., 2015	Healthy adults	CADSS
Cannabis	van Heugten - van der Kloet et al., 2015	Healthy adults	CADSS

(*Continued*)

Table 3. (Continued).

Method	Example studies	Sample(s)	Employed measure(s) to assess induced dissociative symptoms[a]
Salvia divinorum	Addy et al., 2015	Healthy adults	Qualitative assessment
Reboxetine	Mertens et al., 2023 (unsuccessful)	Women with PTSD	CADSS, RSDI

[a]Most studies used scores of the total scale as a manipulation check and did not differentiate between included phenomena. For a more detailed description of each study, assessed phenomena, and differentiation between those, see Supplemental Table S1. [b] Due to an error in administration, participants were asked to report symptom frequency over the past 6 months. Abbreviations: ADI = Acute Dissociation Index (ADI; Leonard et al., 1999); DDQ = Depersonalization-Derealization Questionnaire (DDQ; Miller et al., 1994). For all other abbreviations, see Table 2.

Ethical considerations

When employing symptom provocation paradigms, it is of utmost importance to adhere to high ethical standards. First, participants need to be informed which symptoms are to be elicited during the study, how long they will presumably last and when and how the study team will assist them in managing those symptoms. For effective support during both diagnostic assessments and experimental procedures, the research team must possess the necessary knowledge and skills to assist individuals experiencing dissociative symptoms. Means to counteract dissociative symptoms should be employed as soon as the dissociative state is no longer needed for the experiment, latest at the end of the session, to ensure that the dissociative state has subsided before participants are sent home. Grounding techniques such as guiding participants to describe their surroundings or sensory stimulation techniques, such as pleasant odors, can be helpful when individuals report diminished perception (see Chessell et al., 2019; Schauer & Elbert, 2010). Additionally, if there is a physiological shift toward a shutdown and parasympathetic dominance of the autonomic nervous system, motoric activation strategies, such as applied tension techniques, should be employed. It's essential to be mindful of reduced awareness and adapt communication by using simple phrases and addressing the individual by their given name. Support should be provided as long as necessary to ensure the individual is well enough to leave the research setting. For more detailed information on anti-dissociative techniques see the supplement.

Please also note that with the methods common in trauma and biopsychological research, dissociative symptoms might also sometimes be provoked unintentionally. For instance, detailed interviews on traumatic experiences and posttraumatic psychopathology, other aversive paradigms, and the (sensation-depriving) MRI setting might unintentionally provoke dissociative symptoms (see also Michal et al., 2007). Therefore, we recommend optimizing

study settings to minimize dissociative side effects and/or adhering to the same ethical standards as when dissociative symptoms are intentionally provoked.

4. Considering critical sample characteristics

There are critical features that contribute to heterogeneity within and across study samples, which need a nuanced approach in both research and clinical understanding. Of particular interest when designing, analyzing, and reporting a study examining dissociative symptoms are those sample characteristics which have been empirically linked to the intensity or quality of dissociative symptoms. Those should be critically considered when investigating this complex phenomenon. Below, we summarized the state of evidence on the link between dissociative symptoms, trauma history (with a special focus on childhood maltreatment), age, gender, and other potentially relevant sample characteristics and deduce recommendations for future research.

Trauma history

A meta-analytic review suggests that childhood maltreatment and trauma play a key role in the pathogenesis of dissociative symptoms (Dalenberg et al., 2012), while, particularly, childhood physical and sexual abuse as well as neglect are most important risk factors for adult symptoms of dissociation (for a metaanalysis see Vonderlin et al., 2018). Furthermore, the number of different types of traumatic experiences across the lifespan is associated with increased levels of dissociative symptoms (Schalinski et al., 2019). Both experiencing trauma throughout one's lifetime and enduring maltreatment during childhood emerged as significant predictors of trauma-related dissociative symptoms (Frewen et al., 2019) and are a critical factor that call for delineation in research (Teicher et al., 2022). Furthermore, it is worth noting that childhood maltreatment is not only linked to dissociative symptoms but has also been associated with neurobiological alterations (Kerr et al., 2021; Teicher et al., 2016), which also often serve as an outcome in dissociation research (Roydeva & Reinders, 2021).

Age

Regarding age, several large-scale studies indicate that across different populations (e.g., children, adults, veterans, clinical and non-clinical samples, victims of childhood abuse and neglect), younger individuals are more prone to dissociative symptoms than older individuals (e.g., Espirito Santo & Luís Pio-Abreu, 2008; Herzog et al., 2020; Spitzer et al., 2006; Vonderlin et al., 2018; White et al., 2022). One possible explanation for this rather consistent finding could be that younger individuals, in contrast to older individuals, are less

capable to physically remove themselves from stressful situations, specifically with a primary caregiver being the perpetrator, and use dissociation as an easily accessible coping mechanism to reduce distress in adverse environments (White et al., 2022).

Gender

Studies on associations between dissociative symptoms and gender are far more inconsistent. While some studies found that dissociative symptoms are more prevalent in either women (Espirito Santo & Luís Pio-Abreu, 2008; Irish et al., 2011) or men (Seedat et al., 2003), the majority of studies indicate no significant gender differences in dissociative symptoms (Maaranen et al., 2005; Punamäki et al., 2005; Sayar et al., 2005; Spitzer et al., 2003; Tolmunen et al., 2007; Vonderlin et al., 2018). One reason for these inconsistent findings might be that while men and women generally do not differ in dissociative symptoms, they might differ in specific dissociative symptom types (e.g., Maaranen et al., 2005). Moreover, a longitudinal study in sexually abused children suggests that dissociative symptoms might change differently in boys and girls, with girls displaying a decline and boys showing an increase in dissociative symptoms over time (Bernier et al., 2013).

Other factors

In addition to trauma history, age and gender, a growing body of research has targeted other characteristics which could potentially give rise to dissociative experiences, such as education (Espirito Santo & Luís Pio-Abreu, 2008), hormones (Bryant et al., 2011; Lee et al., 2022), cultural background (Fung et al., 2024; Pierorazio et al., 2023), hypnotizability (Wieder et al., 2022), fantasy proneness (Merckelbach et al., 2022), hyperassociativity (Huntjens et al., 2021), alexithymia (Elzinga et al., 2002), and vertigo (Tschan et al., 2013). More research is needed to better understand how these characteristics influence the clinical and non-clinical presentation of trauma-related dissociative experiences and, therefore, how they can be taken into consideration when studying dissociative symptoms. Further, when preparing participant instructions, one might also consider, assess, and standardize factors which might boost dissociative responding to symptom provocation (e.g., sleep; Giesbrecht et al., 2007; van Heugten - van der Kloet et al., 2015) and factors generally known to alter stress responses such as (de-)hydration (Hoeschel et al., 2008), time of the day (Roeser et al., 2012), and caffeine/nicotine/drug intake.

Recommendations

Altogether, the current state of evidence supports links between trauma exposure characteristics and age and occurrence, severity, and endurance of dissociative symptoms, is ambiguous regarding gender, and in an early phase regarding other sample characteristics. Further, a broad range of mental disorder symptoms have been consistently linked to dissociative symptoms (see introduction; Lyssenko et al., 2018).

Accordingly, we first and foremost recommend characterizing one's study sample carefully regarding all mentioned features (especially age, trauma exposure, and psychopathology) when investigating dissociative experiences. Particularly, we recommend characterizing participants' trauma history with greater precision (for reviews of measures see Danese, 2020; Gadeberg et al., 2017; Tolchin et al., 2023). For instance, one might assess the types and timing of childhood maltreatment using the Maltreatment and Abuse Chronology of Exposure' Scale (MACE; Teicher & Parigger, 2015) or the Childhood Trauma Questionnaire (CTQ or CTQ-SF; D. P. Bernstein et al., 2003) and combine one of these instruments with a lifetime trauma measure such as the Life Events Checklist (LEC; Weathers et al., 2013b). Further, all common comorbidities of the studied disorder that have been linked to dissociative symptoms should be assessed with validated questionnaires.

In addition, we recommend considering the contributions of these features to your findings, for instance, by examining whether they moderate your findings, by replicating your findings in subsamples with more homogenous sample characteristics, or at least by discussing the potential influence of these features on your findings. Alternatively, you might also, when planning your study, consider investigating the effects of several factors in conjunction (e.g., effects of dissociation and trauma history; Seitz et al., 2024) or, depending on the research question at hand, only include participants with certain characteristics (e.g., childhood vs. adulthood trauma, age range). Relatedly, when employing between-group designs to compare individuals exhibiting dissociative symptoms to those without such symptoms (e.g., healthy controls or individuals without a certain disorder), it becomes challenging to isolate the role of dissociative symptoms alone. One approach to mitigate this issue might be to use trauma-exposed controls or oversample healthy controls in order to account for imbalances with respect to trauma history and, in particular, childhood maltreatment. Similarly, clinical and control groups should also be matched age-wise. Lastly, the field might also profit from using data-driven approaches (e.g., machine-learning, latent-profile analyses, network analyses) to examine the complexity and interconnectedness of sociodemographic, trauma history and clinical variables linked to dissociative experiencing.

5. Concluding remarks

Dissociative symptoms are a prevalent, transdiagnostic phenomenon altering the wellbeing and functioning of many individuals with a broad range of mental disorders (Lyssenko et al., 2018). Yet, empirical research on dissociative symptoms has not yet converged in many areas (e.g., neurobiological correlates, effects on treatment outcome), highlighting the need to differentiate between specific dissociative phenomena and raise and harmonize standards in dissociation research. Here, we have provided a methodological primer (for an overview see Figure 1) which might assist researchers in conducting research on specific dissociative symptoms in a broad range of mental disorders by providing guidelines on assessing dissociative symptoms (*Section 2*), provoking dissociative symptoms in the laboratory (*Section 3*) and considering critical sample characteristics (*Section 4*).

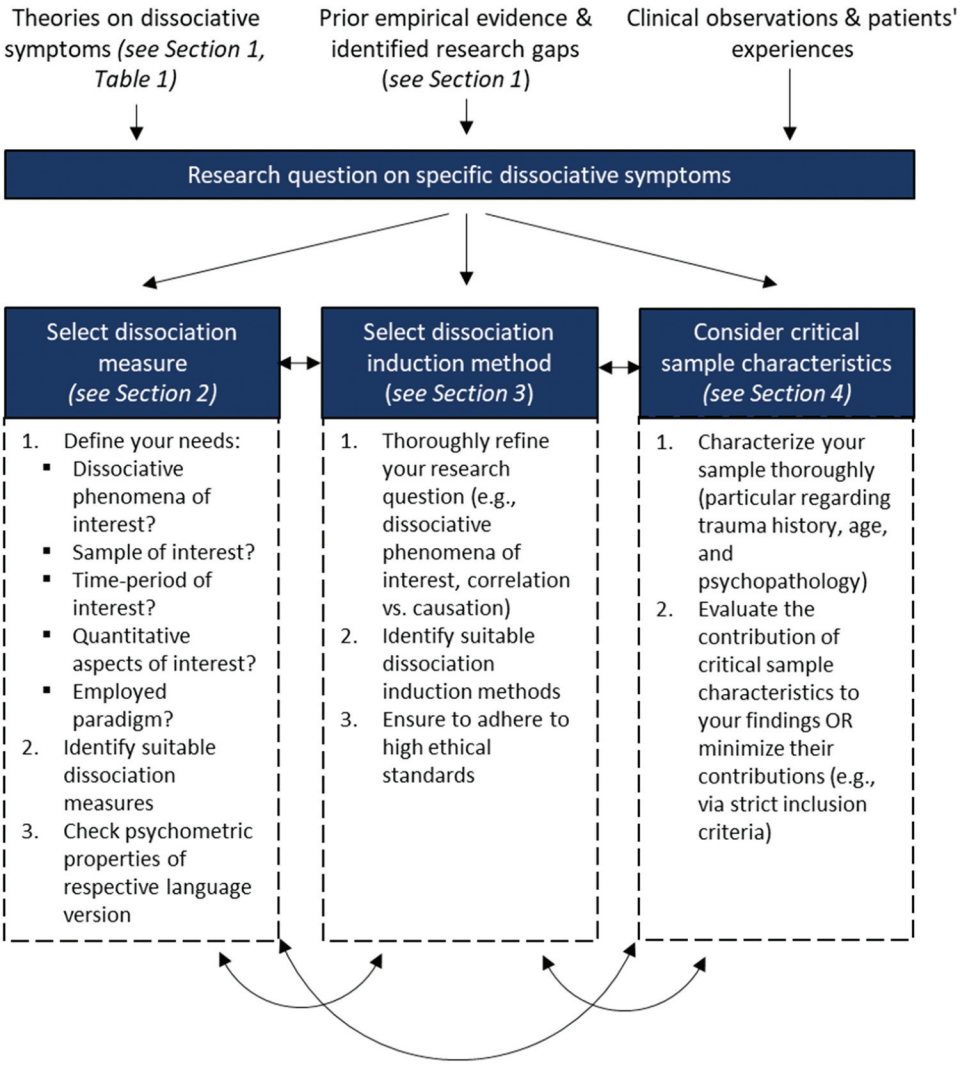

Figure 1. Schematic overview of critical methodological decisions in dissociation research

Further, the replication crisis in fMRI (Button et al., 2013; Cremers et al., 2017) underscores the importance of (funding) appropriate sample sizes and replication studies, detailed preregistration, and transparent reporting and publication (of null findings). Sample size limitations reported in most reviewed articles hinder statistical power, highlighting the necessity of multicenter collaborations and data merging initiatives (for instance, the *ENIGMA* working group, enigma.ini.usc.edu/ongoing/enigma-dissociation-working-group, and the early career researcher network *DIS.connected*, https://disconnected-network.com).

From both clinical and societal standpoints, ongoing investigation of dissociative symptoms is crucial. Dissociative symptoms are often overlooked, yet a widespread phenomenon prominent in both clinical and non-clinical samples (Kate et al., 2020; Lyssenko et al., 2018). They have also been associated with elevated self-harm and suicidality (Černis et al., 2019; Foote et al., 2008), and individuals with dissociative disorders are often misdiagnosed and undergo lengthy hospitalizations (Brand et al., 2012; Nester et al., 2022; Reinders et al., 2019). Further, dissociative experiencing, especially in its more severe expressions as in dissociative disorders, is a phenomenon that has attracted the interest of the general population consuming topic-related books, movies, series, or social media accounts on Youtube, Instagram, or TikTok. While public education and discussion on dissociative symptoms may increase sensitivity and compassion and ultimately encourage funding for clinical treatment options and research, unnuanced media portrayal and misrepresentation may cause further stigmatization of an already isolated patient population (Snyder et al., 2024). Meanwhile, dissociation-associated debates in the past and present shape public perception and reach within the realm of jurisdiction, forensics, and lawmaking (see, for instance, Brand et al., 2018 vs. Merckelbach et al., 2018). For early career researchers choosing a field of interest, heated scientific and public debates centered around the topic of dissociation may appear politically charged and intimidating. Here, connecting, discussing, and collaborating with other dissociation researchers is strongly encouraged (see also the *DIS.connected* network for early career researchers, https://disconnected-network.com). Including several transdiagnostic and transtheoretical perspectives while making use of state-of-the-art research methods as outlined in this paper may bring further advancements and objectivity into the scientific and public dialogue and ultimately lead to a better understanding of dissociative symptoms across a broad range of mental disorders.

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