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The Official Academic Journal of the European Association of Clinical Psychology and Psychological Treatment

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Editorial

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Behind the Doors: 24 Insights Into Scientific Publishing

Cornelia Weise [1]

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How do you write a farewell editorial after having founded, built, and led a journal as Editor-in-Chief for seven years? And how do you do that at the end of the year, when many of us feel a little exhausted after another fully packed twelve months? This is the season when most of us are less eager to dive into the latest scientific breakthroughs and are more ready to simply count the days until things finally quiet down. The ever-buzzing inbox falls silent, pressing deadlines fade away, and even universities close for the holidays to save a little energy.

But perhaps that's exactly the right mindset for this piece: counting days. So why not draw on that good old German tradition of the Advent calendar – opening one little door after another? Let's open the doors and see what surprises (and lessons) they hold from my seven years as Editor-in-Chief.

#1 New Beginnings. It all began in 2018, when we got in touch with Armin Günther, who was then the Managing Editor at the Leibniz Institute for Psychology (ZPID). We discussed the pros and cons of launching a new journal and quickly became convinced that this project would be a great and innovative way to increase the visibility of clinical psychology in Europe.

#2 Open Access. At the heart of CPE's mission is the Diamond Open Access model, i.e., no fees for authors or readers. This model reflects our belief that scientific knowledge should circulate freely, independent of financial barriers or institutional privileges. My sincere thanks go to the Leibniz-Institute for Psychology for making this true open access possible.

#3 Psychologists as Brand Designers. Of all the tasks that came with launching the journal, designing our logo was one of the unexpected creative challenges. It turned

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out to be a lot of fun, and I'm still very happy with the result. Can you guess all the ideas hidden within it?

#4 Team Spirit. CPE has been a true team effort. Working with my co-editors and our editorial board made the journal what it is today. Sharing ideas, debating choices, and solving problems together was, and is, what kept it moving forward.

#5 Innovation. For a journal, innovation means staying curious and open to new ways of advancing scientific communication. At CPE, we welcome ideas that enhance both the journal's visibility and the impact of clinical psychology. Our new Early Career Researcher Board is one step in that direction, helping shape CPE's future and bring fresh ideas to life.

#6 Editor's St. Nicholas. In an editor's world, St. Nicholas wouldn't fill shoes with sweets and oranges, but with submissions that follow the author guidelines, carefully revised manuscripts, or messages from reviewers who agree to review.

#7 Cornerstones. CPE rests on the steady support of its academic home, EACLIPT. Over the years, EACLIPT has provided stability and exchange, while giving us the freedom to shape the journal's identity. We couldn't have wished for a better foundation.

#8 Copyediting Pro Tip. When you submit your paper and receive detailed instructions on how to prepare your figures and tables, please make sure to follow them. Otherwise, the copyediting team might ask again (and again… and again) to fix the layout. We can't help it. We're a bit nerdy when it comes to the look of a final manuscript.

#9 Responsibility. An academic journal must actively protect and promote scientific freedom – especially when censorship or financial restrictions threaten research, and thus the progress needed to safeguard mental health. I'm deeply grateful that our association, EACLIPT, published a statement on the importance of academic freedom (Martin-Soelch et al., 2025). At CPE, we stand firmly by this commitment.

#10 Student Assistants Do the Trick. Behind every successful project is a great team. Over the years, several student assistants have supported CPE from submission to publication behind the scenes. Thank you, Juliane Haas, Ania Hoffmann Salán, Hannah Sandner, and Annkatrin Simon, for being such an essential part of the team.

#11 Transparency. For CPE, open science is not just a policy, it's a commitment to trust. From the very beginning, we've taken transparent and reproducible research seriously. By implementing the Transparency and Openness Promotion (TOP) Guidelines (Center for Open Science, 2025), CPE actively contributes to making empirical research more transparent, credible, and verifiable.

#12 Recommend Reviewers. The better your reviewer suggestions, the sooner you're likely to hear from us. And just to clarify: we won't contact the colleague with whom you've co-authored 200 papers, the person in the next office, or anyone we can't find in a five-minute web search.

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#13 Recommend Further Reviewers. Yes, three potential reviewers are great, but an even longer list makes us truly happy. Keep in mind that it can take up to 15 invitations to secure just two reviewers who agree.

#14 Backbone. Peer review is the backbone of scientific self-regulation. Imperfect as it is, it ensures that ideas are challenged, refined, and strengthened through the scrutiny of one's peers. I greatly appreciate all reviewers who shared their time and expertise.

#15 Supplementary Material. Once upon a time, in the 1990s, "Available upon request" was acceptable. Today, in 2025, transparency demands more. Upload your supplementary materials, and we'll gladly assist via PsychArchives.

#16 Core of Clinical Psychology. CPE strives to highlight new developments that shape clinical psychology and its practice. Our special issue on mental health innovations in the ICD-11 illustrates this mission (Maercker, 2022). As a European journal, we aim to connect global advances with the realities of clinical work and training across Europe.

#17 Curiosities. Work can wait – curiosity can't! For a quick mental break, take a look at last year's Season's Editorial on visualizations of sex and gender on toilet doors (Rosmalen et al., 2024). Who knows – perhaps it might inspire you to explore some unanswered questions of your own.

#18 Impact. One of the first topics we discussed with our publisher was how to achieve an impact factor as quickly as possible. Even though it took some time, we are grateful and proud that CPE is now listed in the Web of Science and has received its first – and already impressive – impact factor in 2025. CPE will continue to strive for excellence and to further strengthen this achievement.

#19 Revise and Resubmit. A second or third round of revision is rarely pleasant for authors. As editors, we share those sighs. It is challenging for us, too, to ask for more changes. Although the process can be time-consuming and frustrating, the outcome almost always speaks for itself: the papers become stronger. So, keep going; it's worth it.

#20 The Invisible Architecture. No journal thrives without the steady, precise, and patient work of its publisher. People who quietly build up the system, organize workflows, answer support questions, and step in at the last minute to keep everything running. For CPE, the Leibniz Institute for Psychology (ZPID) has been this foundation. Without it, many of our ideas would never have left the drawing board.

#21 Christmas Reading. For those celebrating Christmas, I'd like to highlight our 2022 editorial on how singing under the Christmas tree can positively impact mental health (Kanske & Rief, 2022). It's well worth revisiting at this time of year.

#22 Special Issues. We've published three special issues so far, each capturing a snapshot of a particular research area. My personal favourite is the one on cultural adaptation of psychological interventions. It brings together various approaches to culturally sensitive psychotherapy and provides clear guidelines for reporting cultural adaptations in clinical trials, making it a key resource for transcultural research worldwide (Heim & Weise, 2021).

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#23 The Joy of Discovery. Amid the long list of editorial to-dos, there is one moment that stands out: when you read a submission and suddenly pause. A novel idea, an unexpected dataset, or a brilliant line of reasoning emerges. And for a moment, you remember why you entered academia in the first place: the quiet thrill of discovering something new.

#24 Farewell. Over these years, I have learned a great deal, not only about academic publishing, impact, indexing, and copyediting, but also about responsibility, tackling challenges, and working under a very different kind of time pressure. Along the way, I've met many fascinating people and am very grateful for the projects, collaborations, and initiatives that grew out of these encounters. I am especially thankful for the support of my wonderful co-editors, Winfried Rief and Nadine-Messerli-Bürgy, and our colleagues at ZPID, particularly Judith Tinnes, Gerrit Fröhlich, and Armin Günther. Building this journal together was more often joy than work, and even when things didn't go as planned, our collaboration always stayed constructive. My gratitude also goes to my colleagues and friends who suggested topics, authors, or reviewers (and occasionally stepped in themselves). And to my own research team – thank you for your patience whenever a new journal issue took precedence over our own papers.

CPE will always remain close to my heart. I'm truly grateful to have served as Editor-in-Chief for so many years, and I wish the continuing and new editors a confident, inspired hand and every success in using CPE to strengthen the visibility of clinical psychology in all its relevance, excellence, and diversity.

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Competing Interests: Cornelia Weise is Editor-in-Chief of Clinical Psychology in Europe.

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Systematic Reviews and Meta-analyses

Dissociative Experiences and Substance Use Disorder in Adulthood After Childhood Trauma: A Systematic Review of the Literature

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Supplementary Materials: Data [see Index of Supplementary Materials]

Abstract

Context: Childhood trauma is more prevalent among individuals with substance use disorders compared to the general population, representing a significant public health concern. The presence of comorbid dissociative symptoms poses a significant challenge for psychological care.

Objectives: We conducted a systematic review of the literature, using the PRISMA method, to establish the relationship between dissociative experiences and substance misuse in adults who have experienced traumatic childhood events.

Method: We used electronic databases (PubMed, PsycInfo, PsycArticles, Web of Science and ProQuest) up to August 2023. Studies were selected which included adults over 18 years old who had been exposed to one or more traumatic events in childhood, and which jointly assessed Substance Use Disorder (SUD) and dissociation, using quantitative methodology. The review included both cross-sectional and longitudinal studies, with the risk of bias assessed using the AXIS tool and the Qualitative Assessment Tool for Observational Cohort and Cross-Sectional Studies. The results are entered in a table and analyzed using a narrative summary.

Results: Among the 18 included studies, encompassing a total of 6,451 participants, the majority (n = 10) showed a significant positive correlation between dissociative experiences and SUD. The studies collectively indicate a general trend: childhood traumatic antecedents can influence the severity of dissociative symptomatology and SUD.

Discussion: These results are discussed in greater depth in relation to the two main theories explaining the link between SUD and dissociation, namely *self-medication* and *chemical dissociation*

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theory. This paper clarifies the relationship between dissociation and substance use in a population traumatized in childhood, although the heterogeneity of the studies necessitates a cautious interpretation of this primary finding.

Keywords

childhood trauma, C-PTSD, dissociation, substance use disorder, adults

Highlights

- Early traumatic experiences are a high-risk factor for substance use disorder in adulthood.
- The more frequent the dissociative experiences are, the more severe the substance use tends to be.
- Substance abuse in individuals with traumatic childhood could be explained by chemical dissociation theory.

Context

Childhood trauma is more prevalent among individuals with substance use disorders compared to the general population (Garami et al., 2019; Scheidell et al., 2018). The cumulative nature of childhood traumatic experiences and their impact on the severity of traumatic symptoms and the onset of substance use disorders represents a significant public health concern (Zhang et al., 2020).

Exposure to verbal, physical or sexual abuse or neglect during childhood can lead to the subsequent development of physiological, psychological and neurological disorders in adulthood (Dye, 2018; Gupta, 2013; Kratzer et al., 2022). The Adverse Childhood Experience study (Felitti et al., 1998) has already highlighted the impact of stressful childhood experiences on the adult lives of these individuals. This population generally presents more comorbidities in adulthood, including addiction, depression, suicide attempts, endangerment and somatic illnesses (Felitti et al., 1998; Rogerson et al., 2023), which can lead to premature death. Children who have experienced sexual trauma are the population with the most post-traumatic symptoms (study conducted on children and adolescents aged between 8 and 17, Lofthouse et al., 2024). These symptoms, identified by the diagnostic term Post-Traumatic Stress Disorder (PTSD) as described in the DSM-5, include intrusion, persistent avoidance associated with the event, alterations in cognition and mood, and changes in arousal persist for more than a month (American Psychiatric Association, 2013). When exposure to the event is prolonged or repetitive, as is often the case with childhood traumatic experiences, other disorders may emerge involving all the criteria of PTSD just cited, but also affect/emotion regulation disorders, a sense of being diminished, coupled with feelings of shame and guilt, as well as difficulties maintaining

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relationships (WHO, 2019): this condition is referred to as Complex Post-Traumatic Stress Disorder (C-PTSD).

Individuals who experience potentially traumatic events in childhood, such as those previously mentioned, are more likely to present high levels of dissociative symptoms (Fung et al., 2023; Gobin & Freyd, 2017). This dissociative symptomatology can manifest as depersonalization, derealization and partial or total traumatic amnesia (Nijenhuis et al., 1996). The traumatic model of dissociation (Dalenberg & Carlson, 2012) suggests that it functions as an adaptative mechanism, according to Pavlov's classical conditioning theory from 1903 (Lam et al., 2024). Dissociation is considered as a defense mechanism occurring preconsciously (Kennedy et al., 2004). Thus, dissociation, initially experienced during early traumatic experiences, continues to be used as an emotional self-regulation strategy in response to intense emotions (Lam et al., 2024; Smith, 2021). Research on the psychopathological interactions between dissociative mechanisms and trauma is ongoing and expanding in the literature. However, when this comorbidity is present, aggravated symptomatology is clinically observed: greater symptoms of reliving (Burton et al., 2018), high rates of psychiatric comorbidities (Herzog et al., 2020), feelings of personal devaluation and diminished well-being (Bateman et al., 2024), higher levels of substance use (Thal et al., 2019). However, the presence of the dissociative mechanism predicts an unfavorable prognosis for the improvement of traumatic symptomatology during its management (Ginzburg et al., 2006).

Various theories have attempted to explain the comorbid onset of substance use, such as biopsychosocial or biomedical models, which conceptualize addiction in its multifaceted nature (Skewes & Gonzalez, 2013; Volkow et al., 2016). In clinical psychopathology, Khantzian (1997) theorized the *self-medication theory*. Substances are used to regulate negative affects that cannot be regulated by the individual and his or her personal resources. This theory has been further developed by other authors, who hypothesize that the psychotropic effects of substances could regulate negative post-traumatic affects, that individuals are unable to control (Bordieri et al., 2014; Kearns et al., 2019; Simpson et al., 2014). Each substance appears to regulate specific behaviors or affects in individuals with emotional regulation problems and maladaptive behaviors: opiates would seem to act on intense and violent affects, alcohol would reduce depressive symptoms such as isolation, and stimulants would reduce hyperactivity. However, this theory does not account for dissociative experiences.

Another hypothesis is proposed by Somer et al. (2010), entitled the *chemical dissociation theory*, which posits that the effects of substances on psychological functioning enable the maintenance of the dissociative mechanism. Somer's original study focuses on opioid use as a coping strategy when individual regulatory strategies are insufficient. Consequently, dissociative experiences stemming from childhood trauma appear to be perpetuated into adulthood through the use of various drugs or alcohol (Romano, 2015).

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Early traumatic experiences therefore represent a risk factor for several comorbidities in adulthood, notably SUD (Blanco et al., 2020).

The frequent co-occurrence of these three clinical disorders – traumatic childhood experiences, dissociation and SUD – complicates psychotherapeutic management (Bellet & Varescon, 2019; Camille, 2022). While previous research has extensively explored the comorbidity between PTSD and SUD, the specific role of dissociative experiences in this relationship, particularly in individuals with a history of childhood trauma, remains unclear. To our knowledge, no systematic review has synthesized the evidence addressing this triad. The aim of this systematic review is to identify the links between dissociative experiences and SUD in adults who have experienced childhood trauma. Confirming these links is crucial for optimizing therapeutic care. The therapeutic management of these two concomitant disorders is still being debated in the literature, particularly regarding sequential or integrated treatment. The recent meta-analysis by Hien et al. (2024) has demonstrated that SUD and PTSD can be treated simultaneously (Baker et al., 2012), leading us to question the place of dissociative symptomatology. Incorporating dissociation into the treatment of these two disorders may prove beneficial if this review supports the existence of a relationship.

Method

Search Strategy

The study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and a PRISMA flow chart (Page et al., 2021) The PRISMA method facilitates the writing and reading of systematic literature reviews and meta-analyses by providing 27 methodological points to follow. Our article inclusion strategy followed the PICOTS framework. The excel of eligible articles is publicly available at the OSF (Julien et al., 2024S).

The bibliographic search was conducted on the following databases: PubMed, PsycInfo, PsycArticles, Web of Science and ProQuest, with the following keywords defined according to the Medical Subject Headings (MeSH): (substance-related disorders OR chemical dependence OR drug abuse OR drug use disorders OR substance addiction OR substance use OR substance use disorders) AND (post traumatic stress disorder OR posttraumatic stress disorder OR PTSD OR moral injury OR chronic post traumatic stress disorder OR trauma) AND (dissociative disorders OR dissociation OR dissociative reactions). Filters were: "English", "2014-2023", "adults", "articles". These keywords and filters were applied across the five databases mentioned, following the PRISMA method. The complete search chain comprises all these elements for each database.

We opted to use keywords related to PTSD rather than childhood aversive experiences based on tests conducted in our databases. Using PTSD-related keywords allowed

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us to access studies that consider childhood aversive experiences, which are often mentioned in the abstract rather than the title.

Study Selection

Inclusion and Exclusion Criteria

Studies were included if they: (a) assessed adults who have experienced a traumatic event in childhood, (b) jointly assessed the variables childhood trauma, SUD and dissociation, (c) presented comparisons with control groups, community samples as well as inpatient and outpatient clinical samples, (d) had a quantitative methodology, (e) were published in English.

Manuscripts and doctoral theses were excluded. The period of publication of these articles was between January 2014 and March 2023. This time frame was selected based on an assessment of the number of publications on psychological trauma in Pubmed. The number of publications increases significantly from 2014 onwards, as indicated by the 'results by year' graph. The 2014 limit also allows us to concentrate on the last ten years in order to report on the most recent research on the subject.

Studies were excluded if they: (a) did not indicate the period in which trauma events were experienced (the traumatic event must have occurred in childhood), (b) dealt with the dissociative identity disorder, (c) dealt with behavioral addictions, (d) studied the effects of alcoholization in experimental situations, (e) reported on methadone substitution treatment.

Screening Process

Articles were transferred to a Zotero (2019) folder when the title appeared to meet our objective. Utilizing its Google Chrome extension, Zotero enabled us to save all relevant articles directly into a dedicated folder, facilitating quick access, sorting according to our inclusion and exclusion criteria by creating different sub-folders, and better identification of duplicates. Subsequently, selection was performed based on abstracts. To be selected, abstracts had to present a population that had experienced childhood trauma and at least mention our two target variables, i.e., dissociation and substance misuse. Finally, the articles retained were read in their entirety, refining the final selection stage.

Two investigators (CJ and LB) carried out this selection independently. Additionally, a bibliographic monitoring was established from the screening process to keep authors updated with new publications on the subject. Each data base was last consulted in August 2023. The third investigator was called upon in the event of disagreement (VB). The publication search and search strategy are presented in a flowchart (Figure 1).

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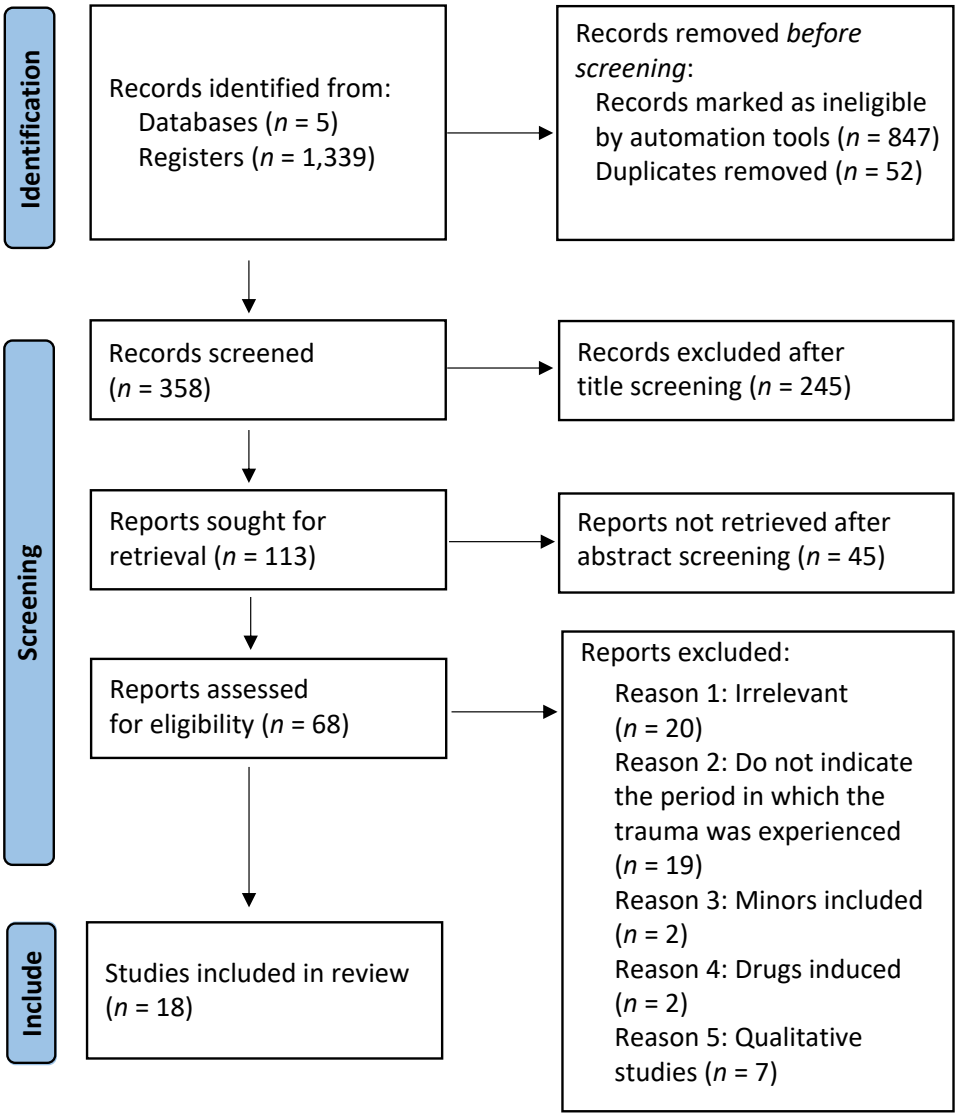
Figure 1

Flowchart of Search Strategy



Data Extraction

The investigators developed a standardized data extraction file to compile all the essential information from the included publications: authors and year of publication, study location, sample characteristics, methodology used and main results relevant to our ob-

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jective (Table 1). One investigator (CJ) extracted the data, which were then independently verified by another investigator (VB). The selected results pertained to the link between dissociative experiences and substance use and were documented in an Excel file.

Study Risk of Bias Assessment

The risk of bias inherent in each study was measured using the AXIS questionnaire for cross-sectional studies (n = 17; Downes et al., 2016) and the Quality-Assessment-Tool-for-Observational-Cohort-and-Cross-Sectionnal-Studies questionnaire for longitudinal study (n = 1). AXIS and Quality-Assessment-Tool questionnaires assessed the quality of studies through 20 and 12 questions respectively, which can be answered with "yes", "no" or "I don't know", on the clarity of objectives, method, results and discussion. Results are presented in Figures 2 and 3. The principal investigator carried out this risk of bias assessment (CJ) and check by another researcher (VB).

Figure 2

Results of Studies' Limits According to the AXIS Tool for Cross-Sectional Design Risk of Bias

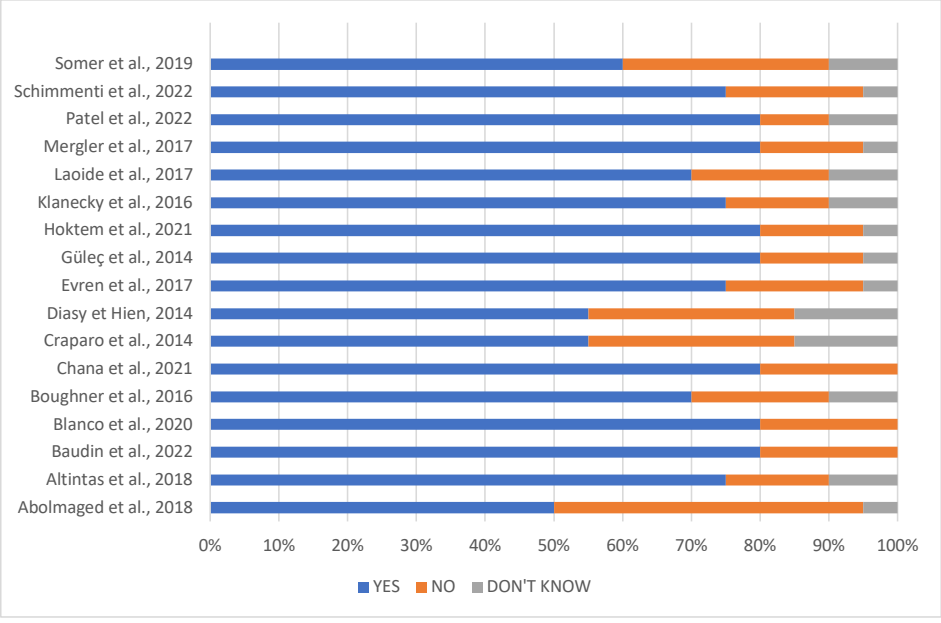

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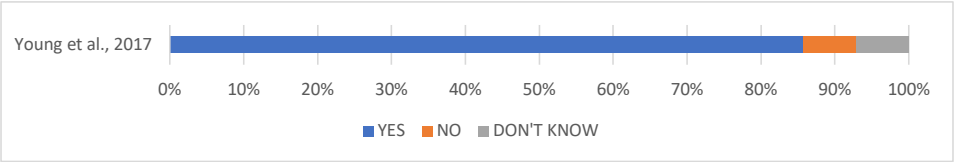
Figure 3

Results of Study' Limits According to the Qualitative Assessment Tool Observational Cohort and Cross-Sectional Studies



Results

Characteristics of Included Studies

A total of 1,339 studies were identified by the five databases mentioned. 52 duplicate articles were removed, and only 358 articles were retained after filtering. The first filtering by title revealed 113 eligible articles; the second after reading of abstracts admitted 68 eligible articles.

A total of 18 studies were finally included in this systematic literature review (for total of 6,451 participants): after full reading, some articles were found to be off-topic (n = 20), others to have no specification of the period in which trauma events were experienced (n = 19), to have included minors (n = 2), to have admitted researcher-induced substance use (n = 2), or to have been qualitative studies (n = 7). These results are presented in Table 1.

The 18 included studies were all published between 2014 and 2022, conducted in Canada, Egypt, France, Germany, Ireland, Israel, Italy, Spain, Turkey and the USA. Sample heterogeneity was observed, encompassing incarcerated individuals, inpatients or outpatients from addictology and/or psychotraumatology units, students, community or homeless people. Psychiatric diagnoses also varied (borderline personality, mood disorder, SUD, dual disorder, etc.).

The studies featured an almost equal ratio of men to women (55% women to 45% men). Half of the included studies (n = 9) focused on a specific sample, while the other half (n = 9) made a group comparison, between subgroups or using a control group. The studies were mainly cross-sectional (n = 17), with only the Young et al. (2017) being longitudinal, with a session every six months for three years focusing on homeless or unstably housed women.

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Table 1

Included Studies

		Sample			Methods/Measurements		
Author/Year	**Country**	**Groups**	***M* (*SD*) Age**	**Gender**	**Questionnaires**	**Time paradigm**	**Results**
1. Abolmaged et al., 2018	Egypt	Group A: Patients BPD (n = 40) Group B: Patients BDP + SUD (n = 40)	24.55 (6.77) 31.30 (11.01)	100% of women	SCID I SCID II BPDSI-IV CTQ DES	Single session	Group A = dissociative experiences greater than Group B.
2. Altintas & Bilici, 2018	Turkey	Prison inmates (n = 200)	18-65 years	50% of women	Interviews CTQ-28 DES	Single session	No direct link between SUD and dissociation.
3. Baudin et al., 2022	France	Patients hospitalized in rehabilitation centers (n = 568)	44.5 (9.0)	15.3% of women	CTQ DES AUD BDI STAI PCL-5	Single session two weeks after detox period	Subjects with high dissociation + SUD = more severe SUD, depression, anxiety and traumatic symptoms, more childhood trauma.
4. Blanco et al., 2020	Spain	Hospitalized patients (n = 150) • Dual disorder n = 100 • Only SUD n = 50	44 (10)	38% of women	SDS EGEP-5 CTQ DES The Holmes-Rahe Life Stress Inventory DDSI PRISM HDRS YMRS BPRS	Single session after initial detox period	No significant correlation between SUD and dissociation.

		Sample			Methods/Measurements		
Author/Year	**Country**	**Groups**	***M* (*SD*) Age**	**Gender**	**Questionnaires**	**Time paradigm**	**Results**
5. Boughner & Frewen, 2016	USA	Group A: Online patients (n = 513) Group B: Clinical sample (n = 12) Total n = 525	34.39 (11.18)	54% of women (Group A) 98% of men (Group B)	LEC-5 ACE PCL-5 SSI-SA PCR Scaling ASSIST	Single session	Correlation SSI-SA – dissociation: Online sample (females): r = .178; p < .01 Online sample (males): r = .271; p < .01 Clinical sample (males): r = -.021; ns
6. Chana et al., 2021	USA	Women prisoners (n = 508)	42.33 (11.71)	100% of women	Betrayal trauma Trauma Symptoms Checklist 40 AUDIT DAST-10	Single session	AUD – Dissociation: r = .02; ns SUD – Dissociation: r = .21; p < .01
7. Craparo et al., 2014	Italy	Outpatients program for alcohol-dependence (n = 234) Control group (n = 117)	Target group = 44.85 (9.94) Control group = 43.98 (9.57)	60 men and 57 women in each group	DES-II TAS-20 TEC	Single session	Group AUD: Correlation childhood trauma - dissociation r = .22; p < .05 Control group: r = .39; p < .01
8. Daisy & Hien, 2014	USA	Inner city women (n = 148)	32.8 (7.9)	100% of women	Demographic and Treatment History Form SCID CTQ Childhood Sexual Abuse Interview CTS-Partner DES	Single session	Correlation SUD – dissociation Standardized beta = .34; p < .001 => r = .84
9. Evren et al., 2017	Turkey	Inpatients with substance use disorder (n = 190): • Group 1: no risk (n = 51) • Group 2: low risk (n = 86) • Group 3: high risk (n = 53)	45.18 (10.68) 44.35 (10.41) 44.77 (9.51)	100% of men	BDI ASRS CTQ-28 DES	Single session 3-4 weeks after the last day of drinking	Correlation AUD – dissociation: r^2 = .374; p < .001 => r = .612

		Sample			Methods/Measurements		
Author/Year	**Country**	**Groups**	***M* (*SD*) Age**	**Gender**	**Questionnaires**	**Time paradigm**	**Results**
10. Güleç et al., 2014	Turkey	Inpatients with conversion disorder (n = 94): • Group 1: suicide attempts (+; SA) n = 33 • Group 2: Suicide attempts (-; nSA) n = 61 • Healthy control (n = 50)	30.33 (10.71) 30.82 (10.83) 34.64 (11.94)	85% of women	SCID-I BDI BAI TAS-20 CTQ-28 DES TCI	Single session	No direct link between SUD and dissociation.
11. Hoktem et al., 2021	Turkey	University student (n = 300)	Group 18-22 years and group 22-25 years	145 women on 300	CTQ DES AUDIT DUDIT	Single session	Correlation AUDIT-DES: r = .486; p < .01 Correlation DUDIT-DES: r = .552; p < .01
12. Klanecky et al., 2016	USA	University students (n = 213)	19.56 (1.12)	63.4% of men	AUDIT DERS DES-II ETI-SR-SF PCL-C	Single session	Correlation AUDIT-DES: r = .368; p < .01
13. Ó Laoide et al., 2018	Irland	Media and press participants (n = 761)	21.46 (2.45)	69.6% of women	CTQ CDS ECR-RS AEE DASS-21	Single session	Drugs and detection of DP OR = 0.90 ⟶ r = -.029; ns
14. Mergler et al., 2017	Germany	Inpatients (n = 337) and outpatients (n = 122) from addiction centers	36.7 (11.2)	59.7% of men	IDCL PDS DES CTQ EuropASI	Single session	Association of the two groups around the SUD: OR = 0.878; ns ⟶ r = -.036
15. Patel et al., 2022	Canada	334 inpatients care for PTSD	44.29 (9.77)	50% of women	PCL-5 MDI AUDIT DERS ACES	Single session	Dissociation – Alcohol related problem: r = .184; p < .05

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		Sample			Methods/Measurements		
Author/Year	**Country**	**Groups**	***M* (*SD*) Age**	**Gender**	**Questionnaires**	**Time paradigm**	**Results**
16. Schimmenti et al., 2022	Italy	1040 community-dwelling adults	29.55 (11.37)	67% of women	CTQ-SF DES-T Level2-Substance Use-Adult	Single session	Correlation pathological dissociation – severity of substance use: $r = .36$; $p < .001$
17. Somer et al., 2019	Israel	Recovering patients R-SUD ($n = 100$) Control group ($n = 80$)	40.2 41.9	100% of men	CTQ DES MDS-16	Single session	R-SUD and dissociation: $d = 0.50$; $p < .001 \longrightarrow r = .243$
18. Young et al., 2017	USA	Homeless or unstably housed women ($n = 300$)	46.99 (8.62)	100% of women	Severity of Violence Against Women Scales DES DIS	One session every 6 months for 3 years (7 time points)	No direct link between SUD and dissociation.

Note. **BPD**: borderline personality disorder; **SUD**: substance use disorder; **R-SUD**: Recovering from Substance Use Disorder; **DP**: Depersonalization; **AUD**: Alcohol use disorder; **SA**: suicide attempts. **Questionnaires: SCID**: Structured clinical interview for DSM-IV (Axis I and II); **BPDSI**: Borderline personality disorder severity index; **CTQ**: Childhood traumatic questionnaire; **DES**: Dissociative experience scale; **BDI**: Beck depression inventory; **STAI**: State-Trait anxiety inventory; **PCL**: PTSD checklist; **SDS**: Severity of dependance scale; **EGEP**: Global assessment of Posttraumatic Stress Questionnaire; **DDSI**: Dual diagnostic screening interview; **PRISM**: Psychiatric Research Interview for Substance and Mental Disorders; **HDRS**: Hamilton Depression Rating Scale; **YMRS**: Young Mania Rating Scale; **BPRS**: Brief Psychiatric Rating Scale; **LEC**: Lifetime Events Checklist; **ACE**: Adverse Childhood Experience; **SSI-SA**: Simple Screening Instrument for Substance Abuse; **PCR**: Perceived Causal Relations; **ASSIST**: Alcohol, Smoking, and Substance Involvement Screening Test; **AUDIT / DUDIT**: Alcohol / Drug Use Disorder Identification Test; **DAST**: Drug Abuse Screening Test; **TAS**: Toronto Alexithymia Scale; **TEC**: Traumatic Experience Checklist; **CTS-Partner**: Conflict Tactics Scale-Partner Version; **ASRS**: Adult attention-deficit/hyperactivity disorder Self-Report Scale; **BAI**: Beck Anxiety Inventory; **TCI**: Temperament and Character Inventory; **DERS**: Difficulties in Emotion Regulation Scale; **ETI-SR-SF**: Early Trauma Inventory – Self Report – Short Form; **CDS**: Cambridge Depersonalization Scale; **ECR-RS**: Experiences in Close Relationships – Relationship structures questionnaire; **AEE**: Attitudes toward Emotional Expression; **DASS**: Depression, Anxiety and Stress Scale; **IDCL**: International Diagnostic Checklist; **PDS**: Posttraumatic Diagnostic Scale; **ASI**: Addiction Severity Index; **MDI**: Multiscale Dissociation Inventory; **ACES**: Adverse Childhood Experience Scale; **MDS**: Maladaptive Daydreaming Scale; **DIS**: Diagnostic Interview Schedule.

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Assessment Tools Used

Dissociative symptoms were assessed in the majority of studies (n = 13) by the Dissociative Experience Scale (DES), focused on various dissociative events in the participant's daily life. One study used another version of the DES, the Dissociative Experience Scale-Taxon (DES-T; Schimmenti et al., 2022), including so-called pathological dissociation. The remaining five studies used the Multiscale Dissociation Inventory (MDI; Patel et al., 2022), the PTSD Checklist for DSM-5 (PCL-5; Boughner & Frewen, 2016), the Cambridge Depersonalization Scale (CDS; Ó Laoide et al., 2018), or the Trauma Symptom Checklist-40 (TSC; Chana et al., 2021).

Childhood traumas were assessed by the Childhood Trauma Questionnaire (CTQ) in most studies (n = 12), including emotional, physical and sexual abuse, as well as physical and emotional neglect. The remaining studies used the Adverse Childhood Experiences questionnaire (ACE; Boughner & Frewen, 2016; Patel et al., 2022); the Traumatic Experiences Checklist (TEC; Craparo et al., 2014); the Early Trauma Inventory – Self Report – Short Form (ETI-SR-SF; Klanecky et al., 2016); the Severity of Violence Against Women Scale (Young et al., 2017); and the Childhood Experiences of Violence Questionnaire combined with questions chosen and created by the authors (Chana et al., 2021).

Finally, substance use was generally identified by self-report and/or urine testing (n = 8). Five studies used the Alcohol Use Disorder Test (AUDIT; Baudin et al., 2022; Chana et al., 2021; Hoktem et al., 2021; Klanecky et al., 2016; Patel et al., 2022). The study by Hoktem et al. (2021) also combined the AUDIT with the Drug Use Disorder Identification Test (DUDIT), and another study, Chana et al. (2021) combined the AUDIT with the Drug Abuse Screening Test (DAST). The other studies' assessment tools were more heterogeneous: the Severity of Dependence Scale (SDS; Blanco et al., 2020); the Simple Screening Instrument for Substance Abuse (SSI-SA; Boughner & Frewen, 2016); and the Level 2-Substance Use-Adult (Schimmenti et al., 2022). Two studies assessed substance use disorders with a semi-structured interview: the Structured Clinical Interview for DSM-IV (SCID; Daisy & Hien, 2014) and the European Addiction Severity Index (EuropASI; Mergler et al., 2017).

The substances covered in these articles, listed in six studies, include hallucinogens or disruptors (such as cannabis and ecstasy), depressants (heroin), stimulants (amphetamines, cocaine, methamphetamine), inhalants, opiates and opioids, sedatives (such as benzodiazepines) and nicotine.

Correlations Among Dissociation, SUD and Traumatic Events in Childhood

Of the 18 studies identified for this review, only 12 provided quantitative data on the link between dissociation and substance use disorder in adults with childhood psychotrauma. Due to considerable heterogeneity among the studies, a meta-analysis could not be

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conducted, as it was uncorrected by various moderators tested (e.g. socio-demographic data, clinical or non-clinical population).

Only the three studies by Ó Laoide et al. (2018), Mergler et al. (2017), and the male clinical subgroup of the Boughner and Frewen (2016) study showed a negative correlation between dissociation and substance misuse in their respective study populations. These correlations (respectively r = -0.029, r = -0.036 and r = -0.021) were, however, very weak, non-significant with a negligible effect size according to Cohen's criteria.

Significant positive correlation coefficients were found in 10 studies. Only two subgroups did not have significant effect sizes: the alcohol subgroup in Chana et al. (2021) study and the male clinical subgroup in Boughner and Frewen (2016) study. Thus, effect sizes were greater in studies highlighting positive correlations, with correlation coefficients ranging from r = 0.178; p < .01 (Boughner & Frewen, 2016) to r = 0.552; p < .01 (Hoktem et al., 2021).

For the remaining studies, the authors documented direct links between traumatic events in childhood and dissociative experiences and/or traumatic events in childhood and SUD, without specifically highlighting a direct link between dissociation and SUD (Altintas & Bilici, 2018; Güleç et al., 2014; Young et al., 2017). Blanco et al. (2020) acknowledged that the correlation between dissociation and SUD was not significant, without mentioning its value. Abolmaged et al. (2018) observed that participants with borderline personality disorder and SUD had fewer dissociative experiences than the group with substance use disorder only. The authors attempted to explain this outcome in terms of cognitive disorders potentially associated with substance use, making it difficult to identify dissociative symptomatology when it occurs. However, we could also consider the use of substances and the objectives sought in this context, particularly regarding emotional dysregulation, which can be identified both in this personality disorder and in substance users. Finally, Baudin et al. (2022) noted that higher dissociative experiences among study participants were associated with more severe SUD. While most studies acknowledged a positive link between dissociation and SUD, a minority could not demonstrate a significant correlation.

Finally, four studies in this review highlighted a mediating effect of dissociation on the link between adverse childhood experience and substance use (Boughner & Frewen, 2016; Klanecky et al., 2016; Patel et al., 2022; Schimmenti et al., 2022). In the study by Chana et al. (2021), this result was discussed in terms of confusing the subjective experience of dissociative symptoms and substance use: in some cases, the experience of taking drugs can be like the experience of dissociation. The authors therefore recommend that future studies include a qualitative interview to address this limitation when administering dissociation questionnaires.

Studies by Baudin et al. (2022), Blanco et al. (2020), Evren et al. (2017) and Mergler et al. (2017) highlighted the high prevalence of anxiety and depression-type comorbidities among subjects with traumatic childhood experiences, SUD and dissociative experiences.

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General Trend in Studies and Consideration of Heterogeneous Data

Most of the studies included in this review focused on clinical populations (n = 9), particularly patients hospitalized for substance use or PTSD. The general trend revealed by these studies is that traumatic childhood experiences are associated with more severe dissociative symptoms and other severe comorbidities (traumatic, anxiety and depressive symptoms), compared to those without aversive childhood experiences (Baudin et al., 2022; Blanco et al., 2020; Boughner & Frewen, 2016; Patel et al., 2022; Somer et al., 2019). Only Mergler and collaborators (2017) did not find these results in the population treated for SUD: when comparing a group of patients with dissociative symptoms and those without: there was no difference in alcohol consumption or in the history of childhood trauma (although the questionnaires used were the same as those used in previous studies). In short, whether or not the dissociative mechanism was present, or whether or not a traumatic history was present, the proportion of drug or alcohol use was the same. However, these results seem logical given the population studied, i.e. patients in a SUD treatment center, who therefore have an addiction deemed severe enough to benefit from follow-up in a specialized center.

This general tendency for our three variables to be intertwined is also evident in the prison population (Altintas & Bilici, 2018; Chana et al., 2021), particularly when SUD and dissociative experiences are associated with traumatic childhood experiences. More surprisingly, the same pattern of results has been found in general populations where traumatic childhood events can be identified (Boughner & Frewen, 2016; Daisy & Hien, 2014), especially in the university student population (Hoktem et al., 2021; Klanecky et al., 2016). However, studies among students focused on alcohol consumption only and not on drug use. The only study focusing on a general population and drug use (Ó Laoide et al., 2018) reports that depersonalization is closely linked to drug use, including cocaine, ecstasy, heroin or cannabis, and non-prescription drugs such as benzodiazepines. Depersonalization is identified as a marker of a childhood history of emotional and physical neglect (Schimmenti et al., 2022).

Identifying the different types of traumatic childhood events experienced by subjects in each study is challenging. The extensive use of questionnaires such as the Childhood Trauma Questionnaire (CTQ) allows us to consider emotional and physical neglect, as well as emotional, physical and sexual abuse. Physical abuse in childhood appears to be one of the most significant predictors of dual pathology (Somer et al., 2019). Additionally, sexual violence in childhood increases the likelihood of re-exposure to sexual and physical violence in adulthood, presenting a potential risk of revictimization according to the study of Young et al. (2017). However, these results must be interpreted with caution, as this study focuses on a population of homeless women, whose precarious situation may increase their risk of experiencing violence.

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Discussion

This systematic review is the first to examine the impact of dissociative experiences on substance use in individuals with a history of childhood trauma. Most of included studies support a positive correlation with substance use, suggesting that greater dissociative experiences are associated with more severe substance use. Articles that did not report these positive correlations showed weak and non-significant results. Four studies indicate that dissociation acts as a mediator between substance use and the severity of traumatic symptoms. This mediation is supported by the adaptive role of substance use as a coping strategy, which helps suppress intrusive symptoms related to the traumatic experience (hence the clarification of the contribution of self-medication theory) and influences the association between trauma exposure and substance use (Boughner & Frewen, 2016). The severity of traumatic symptoms is associated with an increase in dissociation symptoms, which in turn are linked to greater alcohol or substance use problems (Patel et al., 2022). According to Schäfer and colleagues (2010), studies that do not find a mediation between dissociation, trauma and substance use focused solely on physical and sexual abuse, neglecting other forms of trauma, like emotional abuse. It is therefore crucial to consider the nature of the traumatic event. The studies conducted on general populations, university populations or clinical population with PTSD, but did not specifically focus on population with SUD.

These findings were discussed in relation to the *self-medication* and the *chemical dissociation* hypotheses, raising questions about the causal link between substance misuse, dissociative experiences and traumatic events in childhood.

The self-medication theory posits that substance use regulates post-traumatic symptoms (Khantzian, 1997), without considering dissociation. Conversely, the chemical dissociation theory suggests that substance use maintains the dissociative process. Dissociation serves as a coping strategy, enabling individuals to psychologically survive traumatic events and intense emotional reactions they have not learned to manage (Lam et al., 2024). When dissociative experiences are insufficient, substances fill the gap.

Therefore, the self-medication and chemical dissociation hypotheses are not mutually exclusive: Hoktem et al. (2021), Klanecky et al. (2016) and Güleç et al. (2014) explored the intertwining of these hypotheses in their studies. Substance use helps cope with trauma by including chemical dissociation when dissociative capacities are inadequate and alleviating post-traumatic symptoms, notably by reducing negative affects such as anxiety and depression. In our view, the *chemical dissociation theory* extends the logic of self-medication.

The intertwining of SUD and dissociative experiences in adults who have experienced childhood trauma raises questions and opens up a field that needs further exploration. Articles not included in this systematic review often had the same issue: they focused solely on the relationship between C-PTSD and substance misuse, or C-PTSD and dissociative experiences. In fact, analysis of the psychological processes involved in

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complex trauma often fails to identify relationships between SUD and dissociation. This review demonstrated the importance of identifying this under-researched link. Other studies have focused on different clinical samples, not presenting traumatic events in childhood but showing results consistent with this review. For example, in the study by Tsai et al. (2015), the authors focused on US veterans with wartime PTSD, with or without dissociative symptoms. The dissociative PTSD subgroup presented more severe traumatic symptoms, comorbid anxiety and depressive symptomatology, as well as more problematic alcohol use than the non-dissociative PTSD subgroup. This highlighted that the positive correlations between dissociative experiences and substance misuse can be maintained in other cases of complex trauma. Future research would be interesting to analyze the possibility of this link in other types of traumatic events.

The study by Young et al. (2017) is unique in presenting results according to each drug listed in the sample. For instance, the authors note that stimulant use can be predicted by sexual violence experienced within six months, and that amphetamine use significantly increases the odds of being a victim of physical violence. Other studies listing the drugs used by participants only address substance use disorder in general. It would be beneficial for future studies to mention results according to the specific drug consumed, as different drugs have varying psychological effects.

Limitations

This systematic review of the literature had some limitations, both in its conception and in the original studies included.

This review focuses on a specific population, namely adults who have experienced traumatic events in childhood. Consequently, despite a rigorous and transparent research procedure, some research may not have been included because it does not specify the age at which the traumatic event occurred. Additionally, the heterogeneous results observed may be due to differences between tools for measuring dissociation and substance use. Due to this heterogeneity, we were unable to conduct a meta-analysis, despite controlling for moderating variables. Then, all the articles included in this review were based on self-reports, which may introduce classic social desirability or symptom minimization biases. The studies also varied in terms of socio-demographic characteristics of the sample. Finally, the majority of studies included in this review were cross-sectional, with only being longitudinal. Therefore, the results may reflect individual dispositions associated with a one-session assessment rather than an evolutionary process. Finally, dissociation has multiple assessment tools available, resulting an heterogeneity of assessment modalities. Dissociative symptomatology refers to a continuum ranging from everyday experiences of dissociation to dissociative identity disorder. The various measures of dissociation presented in this review addressed dissociative experiences in subjects' daily lives, although the Cambridge Depersonalization Scale (CDS) refers only to depersonalization and not to derealization. The exclusion of studies dealing with dissociative identity

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disorder allowed us to focus on dissociative symptoms from peritraumatic dissociation, rather than dissociation as encountered in dissociative identity disorder. A challenge for future research will be to homogenize the different assessments of complex trauma and dissociation, to make research results comparable with each other.

This literature review has highlighted the importance of examining the relationship between dissociation and substance use disorder in adults with a history of childhood trauma. It enhances our understanding of the comorbid relationship between these three clinical entities—trauma, dissociation, and substance use disorders—particularly regarding the role of substances as moderators to induce a dissociative state and mitigate traumatic symptomatology. This paper clarifies the relationship between dissociation and substance use in a population traumatized in childhood, a link seldom addressed in current literature, despite its crucial importance in psychotherapeutic treatment.

The strength of this review lies in the integration of diverse samples, ranging from the general population to hospitalized patients, allowing for a broader generalization of the subject. Future research should aim to confirm the theoretical model of substance misuse as both a means of self-medication and a reinforcing or maintenance of chemical dissociation. Moreover, it is essential to clarify the nature of the relationship between dissociation, substance misuse and traumatic symptoms. The psychological effects of substances may fill a gap in dissociative processes or enable the re-experiencing of dissociative experiences. This understanding will help clinicians develop models to conceptualize these relationships and derive management strategies that consider the defensive function of substance use.

Implications for Practice and Research

The literature already addresses the vicious circle maintained by problematic substance use and traumatic symptomatology, particularly with the term dual pathology. However, the impact of dissociation within this cycle is often overlooked. The severity of SUD is exacerbated when dissociative symptomatology is present, which must therefore become a point of vigilance for therapists (Caretti et al., 2018). Dissociation not only aggravates traumatic symptomatology but also strengthens our understanding of the addictive profile, which is now related to maladaptive functioning such as dissociation, emotional dysregulation, obsessive thoughts or separation anxiety (Caretti et al., 2018). Moreover, SUD may influence the persistence and severity of dissociative symptomatology (Wegen et al., 2017). These dissociative experiences are particularly present during acute withdrawal; dissociation and traumatic symptomatology being reported as higher from the first weeks of abstinence, particularly from alcohol and cocaine (Coffey et al., 2007). Dissociation is therefore an important point to consider during treatment, particularly through integrative care. In subjects with SUD, dissociation followed by improvement in affect regulation skills could prevent relapse (Wegen et al., 2017). However, future research will need to focus on these complex treatments, while psychotherapeutic treatments for

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comorbid disorders in dual pathology (PTSD and SUD) are still under consideration and constitute a major public health issue.

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Social Media Accounts: *Cory Julien:* LinkedIn

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Data Availability: The excel of eligible articles is available at the OSF (Julien et al., 2024S).

Supplementary Materials

The Supplementary Materials contain the excel of eligible articles (Julien et al., 2024S).

Index of Supplementary Materials

Julien, C., Bernard, L., & Brejard, V. (2024S). *Dissociative experiences and addictions in adulthood after childhood trauma: A systematic review of the literature. Raw data CJ LB VB 2024.xlsx* [Research data]. OSF. https://osf.io/526rx

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Research Articles

Structured Diagnostic Interviews in Psychotherapy Training: Trainees' Beliefs About Interviews and Their Relationship to Overall Interview Satisfaction

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Supplementary Materials: Materials, Preregistration [see Index of Supplementary Materials]

Abstract

Background: Structured diagnostic interviews (SDIs) are frequently used in science and are highly recommended for diagnosing mental disorders in clinical practice. However, the actual SDI familiarity and use among psychotherapy practitioners is limited. To identify opportunities for training improvement and ensure a frequent SDI application by future practitioners, data on SDI experiences and beliefs among current psychotherapy trainees is essential.

Method: N = 233 psychotherapy trainees completed an online survey that included questions about their SDI experiences, use, beliefs, and their estimation of patient SDI satisfaction and acceptance. In addition, adherence to psychotherapeutic orientation and personality factors were assessed. Correlation between SDI satisfaction and familiarity was computed. Multiple linear regression analysis was performed to predict trainees' SDI satisfaction by beliefs about SDIs. Exploratory correlations between SDI satisfaction, adherence to psychotherapeutic orientations, and personality factors were analyzed.

Results: SDI familiarity was significantly related to trainees' overall SDI satisfaction. Both positive (e.g., "SDIs are efficient") and negative (e.g., "SDIs disturb the relationship to patients") beliefs

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about SDIs predicted trainees' overall satisfaction. Small relationships were found between SDI satisfaction and adherence to psychotherapeutic orientation, but none to personality factors.

Conclusion: Psychotherapy training programs should provide sufficient opportunity for SDI practice to promote trainee satisfaction. Training providers should address trainees' beliefs and concerns, underline advantages of SDIs, and inform about actual SDI acceptance among patients to resolve prejudice. Trainees' personality appears to be less relevant to SDI satisfaction, but further investigations are needed. The findings have important implications for overcoming barriers to the use of structured diagnostic interviews.

Keywords

structured diagnostic interviews, psychotherapy training, interview satisfaction, psychotherapeutic orientation, personality

Highlights

- Most psychotherapy trainees encounter SDIs, but experiences and use vary.
- Trainees' level of SDI satisfaction is medium on average, but it positively relates to familiarity.
- Satisfaction is higher when SDIs are viewed as reliable and efficient.
- The views that SDIs are confusing and threaten the therapeutic relationship raise dissatisfaction.

Diagnostic decisions of mental health practitioners often deviate from the criteria of classification systems, increasing the risk for inaccurate diagnoses and suboptimal treatment recommendations (Rettew et al., 2009; Wolkenstein et al., 2011; Zimmerman & Mattia, 1999). Structured diagnostic interviews (SDIs) have been repeatedly proposed as a standard procedure to help diagnostic decision-making (Basco et al., 2000; Joiner et al., 2005; Miller et al., 2001). While broader SDIs, such as the Structured Clinical Interview for DSM-5 (SCID-5, First et al., 2016) assess a range of diagnoses, diagnosis-specific SDIs, like the Clinician-administered PTSD Scale for DSM-5 (CAPS, Weathers et al., 2013) focus on a single disorder. Previous evidence indicates that SDIs have high reliability, validity, and acceptance among patients (Margraf et al., 2017; Neuschwander et al., 2017; Osório et al., 2019; Suppiger et al., 2009).

Despite the advantages of SDIs, a substantial number of clinicians refrains from their regular use in clinical practice (Bruchmüller et al., 2011; Cook et al., 2017; Hatfield & Ogles, 2004; Jensen-Doss & Hawley, 2010). A survey by Bruchmüller et al. (2011) on the SDI practices of licensed psychotherapists revealed that, on average, SDIs are used in only 15% of patient encounters. The most common arguments against the use of SDIs include their lack of usefulness compared to clinicians' own judgement, their length, and their potential harm to the therapeutic relationship, all of which predicted practitioners' actual use of SDIs. In light of the acceptance and satisfaction rates among patients

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(Suppiger et al., 2009), Bruchmüller et al. (2011) concluded that practitioners tend to overestimate the negative and underestimate the positive impact of SDIs.

Interestingly, actual knowledge of SDIs among practitioners is limited. More than a third of the Bruchmüller et al. (2011) sample was barely or not at all familiar with SDIs, with SDI familiarity predicting SDI use. Similarly, Cook et al. (2017) found that practitioners who predominantly endorsed unstructured assessment practices were less likely to report training in standardized assessment, including standardized diagnostic interviews. These findings suggest that implementation of SDIs into early professional training is not only important for fostering competence, but also for ensuring their regular use. Psychotherapy training guidelines consider assessment competencies as crucial, yet they do not necessarily recommend specific diagnostic methods (Hatcher et al., 2013; Wright, 2022). Surveys among psychotherapy trainees and training providers indicate that a considerable number of trainees do not receive formal practical SDI training (Ingram et al., 2022; Mihura et al., 2017; Ponniah et al., 2011). Accordingly, there is a need for information about trainees' actual experiences with and beliefs about SDIs that may help identifying facilitators and barriers to SDI training.

Another finding from the Bruchmüller et al. (2011) study is that a primary orientation in cognitive-behavioral therapy (CBT) positively predicted SDI use. Most likely, this is accounted for by CBT therapists' more positive attitude towards symptom-based classification systems (Raskin et al., 2022). Additionally, the preferred theoretical orientations of psychotherapists have been found to be related to their personality. Poznanski and McLennan (2003) reported higher neuroticism in psychodynamic psychotherapists compared to CBT therapists, whereas the latter showed lower levels of openness. Ogunfowora and Drapeau (2008) found that conscientiousness positively predicted a CBT orientation in psychotherapy students and psychotherapists. To clarify whether trainees' personality not only relates to broader theoretical orientation preferences, but also to evaluations of SDIs directly, a combined investigation is necessary. Results could inform the development of SDI training schedules that consider trainees' individual differences, especially with respect to their personality. As personality has been shown to relate to professional development and well-being throughout training (Chapman et al., 2009; Evers et al., 2019), it might also be worth considering it when training and supervising student therapists in conducting an SDI.

Building upon previous findings on SDI practices and beliefs of practitioners (Bruchmüller et al., 2011; Cook et al., 2017), the present study investigated experiences with SDIs among German psychotherapy trainees. Participants completed an online survey on their SDI use, overall satisfaction, their beliefs about SDIs, their estimation of patients' SDI satisfaction and acceptance, as well as personality factors and adherence to psychotherapeutic orientations. Extending the findings by Bruchmüller et al. (2011), the present study examined the relationships of psychotherapy trainees' overall SDI

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satisfaction with specific positive and negative beliefs about SDIs and SDI familiarity. The following main hypotheses were tested:

1. There is a significant relationship between overall SDI satisfaction and SDI familiarity.
2. Overall SDI satisfaction is related to psychotherapy trainees' agreement to positive and negative beliefs about SDIs.

In addition, exploratory analyses were performed to investigate the relationship between trainees' SDI satisfaction, their adherence to psychotherapeutic orientations, and personality factors.

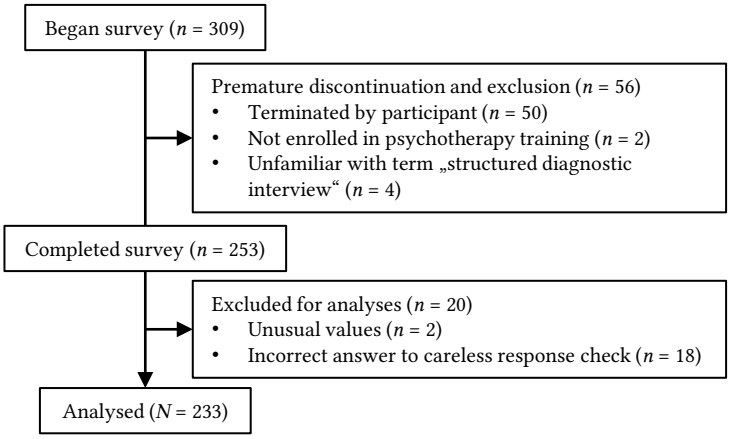
Method

Participants

Participants were recruited among training institutions for post-graduate psychotherapy training in Germany (for further information see Procedure). Figure 1 shows participant flow.

Figure 1

Participant Flow Chart



The final sample for analysis consisted of $N = 233$ psychotherapy trainees. The mean age was $M = 31.05$ years ($SD = 5.72$). On average, participants were enrolled for $M = 3.05$ ($SD = 2.02$) years into their current training program and had $M = 3.96$ ($SD = 3.39$) years

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of experience in working with patients, with six participants reporting no prior patient experience. For further participant information see Table 1.

Table 1

Demographic and Training Information of Psychotherapy Trainees

Variable	*n*	%
Gender		
Female	202	86.7
Male	30	12.9
Diverse	1	0.4
Type of training		
Psychological psychotherapy	171	73.4
Child and adolescent psychotherapy	61	26.2
Other	1	0.4
Training orientation		
Behavioral therapy	208	89.3
Psychodynamic psychotherapy	10	4.3
Psychoanalytic psychotherapy	2	0.9
Systemic psychotherapy	9	3.9
More than one orientation	4	1.7
Study course prior to training		
Psychology	204	87.6
Medicine	1	0.4
Social pedagogy	11	4.7
Educational sciences	12	5.2
Other	10	4.3
Type of training institute		
University-based	119	51.1
Private	112	48.1
Other	2	0.9

Note. $N = 233$.

Surveys and Measurements

At the beginning, the survey explained the term "structured diagnostic interview" and gave examples of common interview schedules (see Supplement 1). Subsequently, participants were asked about the context in which they learned or practiced SDIs, the total number of SDIs conducted, their familiarity with SDIs (1 = "not at all familiar" to 9 = "very familiar"), and their overall satisfaction with SDIs (0 = "not at all satisfied" to 100 = "totally satisfied"). The latter rating was adapted from the Interviewer Acceptance Questionnaire (Suppiger et al., 2009). Furthermore, participants rated their current frequency

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of use of different diagnostic information and methods to assess diagnoses during patient encounters (1 = "never" to 9 = "always"), and their estimated use of SDIs for diagnosing patients after completing training (1 = "never" to 9 = "always").

The therapist version of the Patient Acceptance Questionnaire (PAQ, Bruchmüller et al., 2011; Suppiger et al., 2009) was included to measure participants' estimation of patients' SDI satisfaction and acceptance. First, participants estimated patients' overall SDI satisfaction (0 = "not at all satisfied" to 100 = "totally satisfied"). Second, ten single items assessed participants' estimate of patients' acceptance. The single items include both positive (e.g., "In an SDI patients feel that the interviewer takes their problems seriously") and negative statements (e.g., "Patients find SDIs exhausting"). Participants rated their endorsement of each item on a four-point scale (0 = "does not apply at all", 1 = "somewhat applies", 2 = "quite completely applies", 3 = "completely applies").

Additionally, participants rated their agreement to six positive and nine negative beliefs about SDIs (see Supplement 2). Eleven items (e.g., "SDIs help not to overlook anything", "SDIs take too long") were adapted from Bruchmüller et al. (2011). The first author formulated four additional items (e.g., "SDIs help to broaden one's own diagnostic competence", "Learning SDIs takes too much time") based on feedback from participants of a psychotherapy training course. Participants rated their agreement to the presented beliefs on a nine-point scale (1 = "I totally disagree" to 9 = "I totally agree"). In addition, participants could provide further statements on SDIs.

Participants' personality factors were measured using the German short version of the Big Five Inventory (BFI-K, Rammstedt & John, 2005). Based on the five-factor model of personality, the BFI-K contains the scales extraversion, agreeableness, conscientiousness, neuroticism, and openness. It consists of 21 items which participants rate on a five-point scale (1 = "strongly disagree" to 5 = "strongly agree"). The BFI-K has sufficient validity and reliability across different samples (Kovaleva et al., 2013; Rammstedt & John, 2005).

Finally, participants' demographic information, including age, gender, previous study courses, and information on their current training program were assessed. Additionally, participants rated their adherence to different psychotherapeutic orientations (psychodynamic/ analytic, cognitive/ behavioral, and systemic psychotherapy) on a nine-point scale (1 = "not at all" to 9 = "very strongly"). These orientations were chosen because they are offered by state-approved post-graduate training institutes in Germany.

The survey included two instructed response items to check for careless responding. In the first item, participants were instructed to choose the option "slight agreement" on a five-point rating scale ("strong disagreement", "slight disagreement", "neutral", "slight agreement", "strong agreement"). The second item used a multiple-choice format with four options numbered 1 to 4, where participants were instructed to choose "Option 4".

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Procedure

The data were collected between February and June 2023. The online survey was created using SoSci Survey (Leiner, 2024) and was made available on http://www.soscisurvey.de. The link to the survey was sent via e-mail to 172 state-approved training institutions for post-graduate psychotherapy training in Germany from all four major psychotherapeutic orientations (behavioral, psychodynamic, psychoanalytic, and systemic psychotherapy). Institutions were contacted either directly through the contact information on their website or through a mailing list. Contact persons were asked to disseminate the information and link to the survey among the institutions' current psychotherapy trainees. Upon accessing the link, participants received participant information and actively consented to survey participation. Participants could enter a personal e-mail address for a chance to win one of five 20€ online vouchers after survey completion. E-mail addresses were saved separately from participants' survey data to ensure anonymity.

Statistical Analysis

All analyses were performed using IBM SPSS Statistics (Version 28). The main analyses were preregistered at *AsPredicted* (https://aspredicted.org/N3F_9T3). Secondary analyses as well as descriptive analyses regarding a further student sample, as described in the pre-registration, will not be reported in the present manuscript. Due to the composition of the sample and the results of the correlational analyses, the pre-registered test of regression and mediation models concerning personality factors and adherence to orientation were not computed. Only the results from exploratory correlational analyses are reported (see Results).

Significance level was set at $\alpha = .05$ for all analyses. A two-tailed test of correlation between SDI familiarity and overall SDI satisfaction was computed. Additionally, a multiple linear regression model of overall SDI satisfaction on the agreement to 15 beliefs about SDIs was computed. All predictors were entered in a single step. A priori power analysis using G*Power (Faul et al., 2009) indicated that a minimum of $N = 143$ participants was needed for the regression analysis to detect a medium effect with power = .80. Small to moderate intercorrelations were observed between predictors, but mean VIF = 1.75 indicated no multicollinearity (see Supplement 3). Exploratory correlations between overall SDI satisfaction, the BFI-K subscales (Rammstedt & John, 2005), and the ratings of adherence to psychotherapeutic orientations were computed. Due to the negatively skewed distribution for the cognitive/behavioral and the positively skewed distribution of the psychoanalytic/psychodynamic orientation ratings, non-parametric Kendall's Tau C correlations are reported.

The answers to the open question about further beliefs about SDIs were categorized by the first author. First, specific entries were categorized into positive and negative

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arguments. Second, specific topics were identified. The most frequent topics for both positive and negative arguments, along with examples of participant entries are reported.

Results

SDI Experience, Use, and Satisfaction

Participants commonly reported treatment of outpatients (70%) as a context for SDI encounters, followed by courses during their master's program and training (67.4%), treatment of inpatients (50.6%), and research (28.3%). The estimated number of SDIs conducted by psychotherapy trainees ranged from zero to 200 interviews. Most trainees (42.1%) conducted 10 or fewer SDIs, with 13 participants reporting that they had never conducted an SDI before. The majority (66.5%) of participants stated that conducting SDIs was mandatory during their training program.

On average, trainees reported a medium level of overall SDI satisfaction (M = 60.43, SD = 20.83, range: 0 − 100) and endorsed a moderate level of SDI familiarity (M = 6.03, SD = 1.78, range: 1 − 9). A moderate positive correlation between overall SDI satisfaction and SDI familiarity was observed, $r(231) = .41$, $p < .001$.

Concerning estimated SDI use after training (M = 5.79, SD = 1.81, range: 1 − 9), 2.6% of trainees stated that they would "never", while 6.4% stated that they would "always" use an SDI for diagnosing patients. For diagnosing patients, trainees with patient experience (n = 227) reported to use clinical history taking most frequently, followed by questionnaires, classification systems, and SDIs (see Figure 2).

Trainees' Estimation of Patients' SDI Satisfaction and Acceptance

Psychotherapy trainees estimated a medium level of overall SDI satisfaction among patients (M = 55.60, SD = 20.62, range: 0 − 95). The positive statements with the highest mean agreement ratings were the statement: "During an SDI, patients feel that the interviewer takes their problems seriously" (M = 1.82, SD = 0.86) and the statement: "After an SDI, patients think that the interviewer asked for enough detail to get an appropriate understanding of their situation" (M = 1.82, SD = 0.87). In contrast, psychotherapy trainees tended to only partially agree or disagree with the statement: "Patients have the feeling that they understand themselves and their problems better after an SDI" (M = 0.84, SD = 0.77). Among the negative items, the estimation that patients find SDIs exhausting received the highest mean agreement (M = 1.50, SD = 0.80). Descriptive statistics on all PAQ items are shown in Supplement 4.

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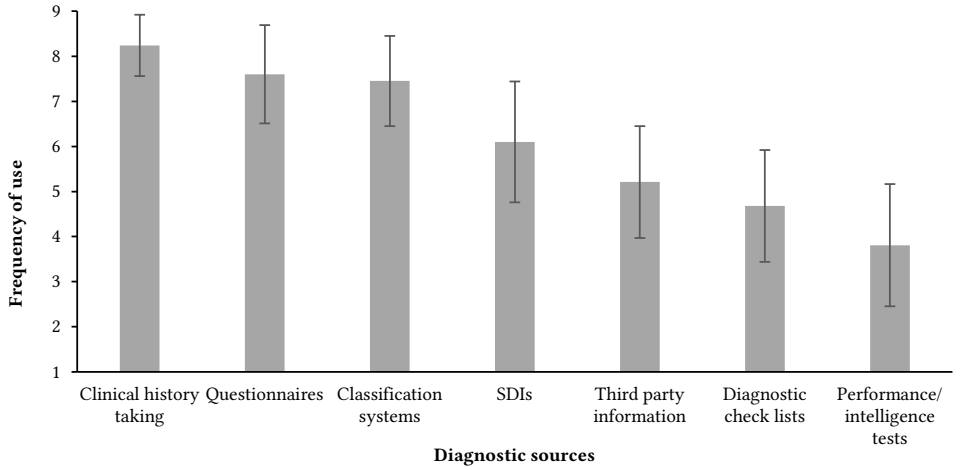
Figure 2

Psychotherapy Trainees' Use of Diagnostic Sources for Diagnosing Patients



Note. n = 227; SDI = structured diagnostic interview; frequency of use was rated from 1 ("never") to 9 ("always"); error bars indicate standard deviations.

Prediction of Psychotherapy Trainees' SDI Satisfaction by Beliefs About SDIs

The regression model of overall SDI satisfaction on beliefs about SDIs was significant, $F(15, 217) = 17.01$, $p < .001$. The whole model explained 54% of variance. Descriptive and regression statistics for all beliefs are shown in Table 2. Two of the positive beliefs ("SDIs are reliable sources of information", "SDIs are efficient") positively predicted overall SDI satisfaction, whereas two of the negative beliefs ("SDIs disturb the relationship to patients", "SDIs are too confusing") negatively predicted overall SDI satisfaction.

Trainees' Answers to Open Question

Participants entered 31 further arguments for and against SDIs. Among the positive arguments, the identified topics were: benefit for patients and the therapeutic relationship (e.g., "the diagnosis [using an SDI] induces confidence that the therapist relies on scientific evidence, and not arbitrary; the patient can rely on the result"), and benefit for determining accurate diagnoses (e.g., "in particular cases [the SDI] uncovered symptoms in the past"). Among the negative arguments, the most common topics included: weakness of the interview itself (e.g., "structured interviews are too undynamic"), lack of benefit for determining a diagnosis (e.g., "[…] the interview only showed that there is

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Table 2

Multiple Linear Regression of Psychotherapy Trainees' Overall SDI Satisfaction on Beliefs About SDIs

Predictor	*M* (*SD*)	*B* (*SE*)	95% CI	β	*T*
Positive beliefs					
SDIs help to not overlook anything.	7.33 (1.51)	0.80 (0.79)	[-0.76, 2.36]	0.06	1.02
SDIs help to broaden one's own diagnostic competence.	6.67 (1.88)	0.21 (0.63)	[-1.04, 1.45]	0.02	0.33
SDIs are reliable sources of information.	6.49 (1.47)	3.01 (0.97)	[1.09, 4.93]	0.21	3.1**
SDIs secure the quality of treatment.	6.12 (1.99)	0.21 (0.69)	[-1.14, 1.56]	0.02	0.31
SDIs help with treatment planning.	5.67 (2.07)	-0.33 (0.59)	[-1.49, 0.83]	-0.03	-0.56
SDIs are efficient.	5.19 (1.72)	2.60 (0.73)	[1.15, 4.04]	0.21	3.54***
Negative beliefs					
SDIs take too long.	6.73 (1.86)	-1.34 (0.71)	[-2.75, 0.06]	-0.12	-1.89
My clinical judgment is more useful to me than an SDI.	4.61 (2.12)	-0.87 (0.62)	[-2.10, 0.35]	-0.09	-1.40
SDIs are too confusing.	4.58 (2.10)	-1.74 (0.61)	[-2.94, -0.55]	-0.18	-2.87**
SDIs are unpleasant for patients.	4.50 (1.95)	1.08 (0.67)	[-0.23, 2.4]	0.10	1.62
SDIs are too detailed.	4.40 (1.95)	1.16 (0.65)	[-0.13, 2.44]	0.11	1.78
Learning SDIs requires too much time.	4.11 (2.13)	-0.94 (0.50)	[-1.93, 0.06]	-0.10	-1.86
SDIs disturb the relationship to patients.	3.73 (2.10)	-2.36 (0.66)	[-3.67, -1.06]	-0.24	-3.57***
SDI questions are barely understandable.	3.36 (1.67)	-0.47 (0.70)	[-1.84, 0.90]	-0.04	-0.68
Information from SDIs are not relevant for treatment.	2.27 (1.58)	-0.58 (0.77)	[-2.09, 0.93]	-0.04	-0.76

Note. $N = 233$; $R^2 = .540$; *SE* = standard error; CI = confidence interval; SDI = structured diagnostic interview; trainees' beliefs about structured diagnostic interviews were rated on a scale from 1 ("I totally disagree") to 9 ("I totally agree").
**$p < .01$. ***$p < .001$.

psychological distress, it was not helpful diagnostically"), detrimental effect on patients and the therapeutic relationship (e.g., "SDIs can irritate patients ([they create the] impression that one's very sick if one has to answer such different questions)"), high effort (e.g., "SDI require a lot of time/resources, that, to my experience, are not available in the

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daily clinic routine"), and lack of appropriate compensation (e.g., "structured interviews are not sufficiently rewarded during training (neither monetary, nor for the progress of training), which can be frustrating").

Relationship Between Personality Factors, Adherence to Psychotherapeutic Orientations, and SDI Satisfaction

The exploratory correlational analysis included only participants that reported experience in working with patients (n = 227). A small negative relationship was found between psychotherapy trainees' overall SDI satisfaction and the adherence to a psychoanalytic/psychodynamic orientation, τ_c = -.14, p = .005. In contrast, a small positive relationship was found between psychotherapy trainees' overall SDI satisfaction and the adherence to a cognitive/behavioral orientation, τ_c = .11, p = .005. No relationships were found between overall SDI satisfaction and any personality factor. Full results of the correlational analyses are reported in Supplement 5.

Discussion

The results of the present study indicate that current psychotherapy trainees have encountered SDIs in different contexts throughout training, predominantly during outpatient treatment. Compared to the practitioner sample from Bruchmüller et al. (2011), the degree of familiarity with SDIs was higher, which might reflect a growing importance of SDIs in clinical practice and corresponding changes in the curricula of psychotherapy training. Still, one third of the trainees reported that they were not required to use SDIs during training, and the number of conducted SDIs varied considerably. In line with findings from US samples, SDIs are less frequently used than self-report questionnaires, possibly due to the availability and feasibility of the latter, even though they lack usefulness for diagnostic classification (Ingram et al., 2022; Mihura et al., 2017). The relationship between SDI satisfaction and SDI familiarity underlines the importance of sufficient SDI coverage during training. However, further longitudinal investigations need to clarify the direction of the relationship: while a higher SDI familiarity could lead to higher satisfaction, it is also plausible that a satisfying initial SDI experience could motivate trainees to become more familiar with SDIs.

The results on the beliefs about SDIs show that trainees recognize the advantages of SDIs for practice and professional development, but negative beliefs persist to some extent. Moreover, regression analysis revealed that beliefs differed in their impact on trainees' overall SDI satisfaction. The positive association between SDI satisfaction and the beliefs that SDIs are reliable and efficient implies that educating trainees about the existing evidence on the reliability and validity of SDIs, ideally in the early phases of training, could strengthen their trust in the method and their confidence in their clinical

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decisions (Margraf et al., 2017; Osório et al., 2019). In contrast, SDI satisfaction was negatively related to the belief that SDIs harm the therapeutic relationship. Additionally, trainees estimated patients' overall SDI satisfaction as moderate, on average, which is similar to the practitioner estimation reported by Bruchmüller et al. (2011). Furthermore, 45.9% of the trainees quite or completely agreed that patients find SDIs exhausting. Given these results, it is crucial that trainees learn about evidence of patients' SDI satisfaction and acceptance. Particularly, the finding that most patients view the relationship to interviewers as positive might challenge the misconception that SDIs inherently interfere with the therapeutic relationship (Neuschwander et al., 2017; Suppiger et al., 2009). Additionally, individual patients' SDI acceptance and satisfaction ratings might help trainees and supervisors to identify difficulties and opportunities for improvements in future SDI applications.

Furthermore, a negative relationship was observed between SDI satisfaction and the belief that SDIs are too confusing. The confusion and related dissatisfaction may partly arise from reservations about standard classification systems. Even though classification systems are widely used and considered helpful, many practitioners would prefer concise manuals with fewer diagnostic categories (Evans et al., 2013; Reed et al., 2011). Moreover, the definition and validity of diagnostic criteria of certain disorders, e.g. generalized anxiety disorder, have been repeatedly challenged and debated (Andrews et al., 2010; Ruscio et al., 2024). Confusion could be reduced if trainees receive ongoing support during the study of the diagnostic criteria and the structure of SDIs. Moreover, trainees should have the opportunity to start practicing with non-clinical interviewees. The combination of theoretical and role play sessions in an SDI course for clinical psychology master's students has already proven to be highly accepted by participants (Bonnin et al., 2024). Subsequently, a guided and supervised approach could ensure that trainees gradually move from clearly circumscribed to more complex cases (e.g., with higher comorbidity). Notably, institutions should also consider how trainees could be remunerated more adequately (e.g., additional therapy sessions and credit for training, provide SDI-specific supervision), thus encouraging regular SDI use.

Lastly, the belief that SDIs take too long did not significantly predict SDI satisfaction but had a high mean agreement in the present sample. Similarly, additional participant statements criticized SDIs as being too effortful for clinical practice. The perceived impracticability of SDIs is a common argument against their use, yet many practitioners are barely familiar with SDIs (Bruchmüller et al., 2011; Cook et al., 2017). As interview duration likely decreases along with SDI experience and familiarity, the view that SDIs take too long might change accordingly. Building on the present finding that SDI familiarity positively relates to overall satisfaction, future studies might prospectively assess the duration of individual SDIs and trainees' estimated SDI practicability over the course of training.

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In addition to the impact of trainees' beliefs, the exploratory correlational analyses revealed relationships between SDI satisfaction and adherence to cognitive/behavioral as well as psychodynamic/psychoanalytic orientations. The positive relationship between satisfaction and adherence to a cognitive/behavioral orientation is in line with the results reported by Bruchmüller et al. (2011). As noted earlier, the relationship is likely accounted for by CBT therapists' more positive attitude towards the underlying classification systems (Raskin et al., 2022). For a direct test of this assumption, future studies should jointly assess therapists' attitudes towards classification systems and beliefs about SDIs. In contrast to orientation adherence, trainees' personality appeared to be of less importance for their SDI evaluation, as no significant relationships were found. While personality factors relate to orientation preferences and the underlying general approach to psychotherapy, endorsement and evaluation of SDIs could be more closely related to specific behaviors and skills that are relevant in the therapeutic process. For instance, since the application of an SDI is a form of therapist-patient-interaction, interpersonal behaviors of psychotherapy might be worth investigating in this context. It is important to note that comparisons to previous studies are limited by the high proportion of CBT trainees in the present sample (Bruchmüller et al., 2011; Poznanski & McLennan, 2003), and the small effects from exploratory analyses need to be interpreted with caution.

Study Limitations

The present study has limitations that need to be considered. First, the cross-sectional design does not allow for conclusions regarding possible long-term effects of SDI training (e.g., on actual SDI use after training). Second, certain survey items might have been insufficient. Even though most SDI beliefs were endorsed previously (Bruchmüller et al., 2011), the additional arguments reported by participants suggest that there are more issues relevant to SDI satisfaction. Single items of adherence to psychotherapeutic orientations were used as ecological and integrative measures but may have failed to capture all aspects relevant to orientation adherence. Trainees that are at an early stage of training might have had more difficulties providing accurate answers due to little experience. Third, correlational and exploratory analyses somewhat limit the conclusions that can be drawn. However, the present study has important implications for clinical practice and future research despite this methodological limitation, as it is the first to provide evidence on SDI beliefs and satisfaction among trainees. Finally, as most participants were psychologists in CBT training, the present results may not generalize to trainees with other training orientations and professional backgrounds. Yet, importantly, the present sample is still representative of the current trainee population in Germany, as most psychologists choose a post-graduate training in CBT (Rabe-Menssen et al., 2021).

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Summary and Perspective

The present study is the first to provide evidence for the impact of beliefs about SDIs on psychotherapy trainees' overall SDI satisfaction. The results imply that training programs need to increase their efforts to implement SDI training and provide opportunities for SDI application in different settings to strengthen trainees' SDI familiarity. While considering trainees' needs and concerns (e.g., time constraints, limited compensation), programs need to inform trainees about the evidence on SDIs that highlight diagnostic advantages and common misconceptions, especially regarding their impact on the therapeutic relationship (Neuschwander et al., 2017; Suppiger et al., 2009). Longitudinal studies are needed to determine the impact of SDI training experiences on practitioners' SDI use following training. In addition to overall SDI satisfaction, it would be informative to assess trainees' immediate response to individual SDIs, thus allowing for direct comparisons to previous studies on interviewer satisfaction (Neuschwander et al., 2017; Suppiger et al., 2009). This approach would also enable tracking changes in SDI satisfaction and help determine the number of conducted SDIs required for sufficient experience to benefit from SDIs' advantages. When investigating relations of SDI endorsement and evaluations with individual characteristics of trainees, research might focus more on specific behaviors and skills, as they are possibly more relevant than personality factors, and can be directly addressed and monitored during training. Finally, future evaluations of SDI satisfaction should include trainees with different professional backgrounds and orientations to account for a wider trainee population.

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Reporting Guidelines: The present manuscript was written in accordance with the JARS-Quant reporting standards for non-experimental designs.

Preregistration: The main analyses of the present study were preregistered at *AsPredicted:* https://aspredicted.org/N3F_9T3

Data Availability: The data and materials of this study are available on request from the corresponding author.

Supplementary Materials

The Supplementary Materials for the present manuscript include:

- Preregistration (Palmer et al., 2022S)
- Additional Information (Palmer et al., 2025S):
  - *Supplement 1*: Survey Introduction
  - *Supplement 2*: Beliefs About Structured Diagnostic Interviews
  - *Supplement 3*: Predictor Intercorrelations and Multicollinearity Statistics for Multiple Linear Regression of Overall SDI Satisfaction on Beliefs About SDIs
  - *Supplement 4*: Descriptive Statistics for the Patient Acceptance Questionnaire – Therapist Version
  - *Supplement 5*: Correlations Between Psychotherapy Trainees' Overall SDI Satisfaction, Personality, and Adherence to Theoretical Orientations

Index of Supplementary Materials

Palmer, S., Walter, B., Hermann, C., Stark, R., & Hermann, A. (2022S). *Acceptance and experience with structured interviews* [Preregistration; AsPredicted ID: #95,997]. AsPredicted. https://aspredicted.org/N3F_9T3

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Attitudes and Expectations Towards Mental Health Interventions in the General Population: Comparing Face-to-Face Counseling, Blended Counseling, and Digital or On-Paper Self-Help

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Supplementary Materials: Materials [see Index of Supplementary Materials]

Abstract

Background: Digital interventions are supported by a growing evidence base and have the potential to contribute to accessible and personalized mental healthcare services. When individuals seek help for mental health problems, various intervention options are available in a digital, face-to-face or on-paper format. However, it is important to understand what individuals find important for intervention selection and how they perceive different intervention options.

Method: The study recruited 232 individuals for a cross-sectional online survey on (1) the relevance of 12 evaluation dimensions for mental health support, (2) whether self-help books, digital interventions, face-to-face counseling, and blended interventions would meet expectations, and (3) self-reported likelihood of use.

Results: The most important dimensions for intervention selection were helpfulness, personal support, motivates to get better, and credibility. Face-to-face counseling was evaluated favorably for dimensions linked to intervention content (e.g., helpfulness), while self-help approaches were rated more positively for practical aspects (e.g., waiting time). Blended counseling received fairly

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similar dimension ratings as face-to-face counseling. Self-reported likelihood of use differed significantly between modalities despite large individual differences. Face-to-face interventions were most likely to be used, followed by blended counseling, with digital and on-paper self-help options sharing third place.

Conclusion: The findings suggests that mere self-help (online or on paper) does not sufficiently meet the needs and is not the preferred choice for handling mental health problems for most individuals. If presented with the choice, individuals still prefer face-to-face counseling. Nevertheless, blended interventions can be a promising treatment option for the future.

Keywords

mental healthcare, technology acceptance, self-help, digital mental health, blended care

Highlights

- Mental health services are diversifying but we need to assess attitudes to intervention options.
- Face-to-face support was perceived to be more helpful, motivational and credible than alternatives.
- Self-help approaches were rated more positively for practical aspects but were not preferred.
- Blended interventions were well received but relying on face-to-face support was deemed more likely.

Mental health problems are one of the leading causes of burden worldwide (GBD 2019 Mental Disorders Collaborators, 2022). However, many people, especially young adults, do not seek or find professional help (Bryant et al., 2022). For example, depression is a common and sever mental health complaint but Moitra et al. (2022) calculated that about 39% of individuals with this disorder in high-income countries do not receive treatment. The study by Mauerhofer et al. (2009) in Switzerland found that only 13% of young adults identified by their GP as experiencing depression or sadness actually sought help for that issue. However, help-seeking can also occur beyond face-to-face mental health services in the realm of self-help. In the past, self-help was mainly limited to books, which have demonstrated a moderate degree of effectiveness (Kavanagh & Proctor, 2011; Marrs, 1995). However, individuals now increasingly come across technological resources for self-help as well.

A review on online help-seeking behavior in young people found that the internet can be a gateway to further mental health information and knowledge, a means of connecting with peers or professionals regarding mental health problems, and an alternative to offline help-seeking behavior (Pretorius et al., 2019). Digital self-help services come in various forms, from an informative app or website to a full online treatment program (De Witte et al., 2021). Digital self-help interventions can be provided in an

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unguided (fully autonomous) or guided format which includes support from a professional who (a)synchronously monitors progress and/or provides feedback. There is a large body of empirical support from clinical trials for the efficacy of digital self-help, such as internet-based cognitive behavioral therapy for depression (Karyotaki et al., 2021). The meta-analysis of Madrid-Cagigal et al. (2025) also supported the effectiveness of digital mental health interventions for university students with mental health difficulties. Whether a guided format should be preferred can be dependent on the context and intervention tagets since the study of Madrid-Cagigal et al. (2025) observed a greater effect size for fully automated interventions on anxiety symptoms but not depressive symptoms (perhaps linked to deficits in intrinsic motivation linked to depressive complaints). Self-help applications can show very high drop-out rates. Retention rates as low as 3.3% have been recorded for frequently installed, unguided mental health apps during a 30-day period "in the wild" (Baumel et al., 2019). Retention rates have also been noted as a challenge for the use of self-help books. While bibliotherapy drop-out rates can be acceptable in controlled research with individuals who have a personal interest in the topic, there is little evidence on book completion rates "in the wild" (0-30%; Gualano et al., 2017; Kavanagh & Proctor, 2011). It is also relevant to assess the reach of self-help interventions, as it has been suggested that, for example, book readership might consist of more highly educated individuals and include many who are merely interested in the topic and are not using it as self-help per se (Bergsma, 2008; Kavanagh & Proctor, 2011).

While low perceived need for treatment proves to be one of the barriers to help-seeking behavior in mental health (even in individuals with severe mental health problems; Andrade et al., 2014), digital mental health services can face additional uptake and drop-out challenges. The uptake of digital mental health can be hindered or facilitated by technology acceptance, i.e., attitudes and expectations of end users towards technology (Philippi et al., 2021; Venkatesh et al., 2003). Relevant predictors in the Unified Theory of Acceptance and Use of Technology (UTAUT) are the extent to which individuals believe that a technology can help them achieve their goals (performance expectancy), the amount of effort required to use a technology (effort expectancy), and the opinions of important others regarding technology use (social influence). In line with the role of performance expectancy, the perceived quality and effectiveness of digital interventions has proven to be a key factor in the acceptance of digital mental health interventions for depression, anxiety and stress in adolescents and young adults (Zhu et al., 2025). Several other barriers for using online interventions have been reported. Examples are difficulties with fitting the intervention into the schedule, the lack of a convenient place to perform the intervention, past experiences with an intervention, perceived credibility, and confidentiality (Borghouts et al., 2021). On the other hand, young people have reported that anonymity, privacy, accessibility, inclusivity, and the ability to connect with others are benefits of online help-seeking, which could motivate people to use digital mental health services (Ho et al., 2025; Pretorius et al., 2019).

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Alongside (guided) self-help, digital mental health services can also be used in combination with face-to-face interventions in stepped or matched care approaches in blended care. A blended care model can vary greatly in implemented therapeutic approach, objectives, and digital and face-to-face component features, which poses challenges for defining the concept and evaluating effectiveness (Ehrt-Schäfer et al., 2023; Singh et al., 2022). Reviews have provided initial indications of feasibility and effectiveness when compared to face-to-face interventions in serious mental illness (Cohen et al., 2024; Cooper et al., 2022; Ehrt-Schäfer et al., 2023; Erbe et al., 2017; Köhnen et al., 2021). Cooper et al. (2022) documented significant symptom reduction in blended treatment for anxiety and obsessive-compulsive spectrum disorders, and this reduction was found to be greater than the comparison group in a quarter of the included studies. Erbe et al. (2017) observed lower drop-out and/or greater abstinence as compared to face-to-face treatment in six out of nine studies in patients with substance abuse. While reviews focus on serious mental illness, blended approaches have also been identified as promising for mental health prevention and promotion (Singh et al., 2022). However, it is relevant to note that all reviews identify a need for additional rigorous effectiveness and cost-effectiveness research.

Implementation of digital and blended interventions in practice is hindered by a lack of a clear concept on how technology can be embedded in the healthcare system (including funding challenges) as well as a lack of training regarding digital mental health implementation and differences in the acceptance and preferences regarding digital technology in patients or professionals (Cohen et al., 2024; Titzler et al., 2018). This implies that a limited number of individuals might have already come into contact with digital interventions or blended care. While several reviews and meta-analyses address the acceptance of digital health interventions (e.g., Lau et al., 2024), their scope is often restricted to clinical populations and specific intervention types or indications. Similarly, reviews and models (e.g., UTAUT) exploring the drivers and barriers to adoption predominantly focus on digital interventions in isolation, neglecting comparisons with face-to-face and other modalities like self-help books. Few studies directly evaluate and compare intervention modalities on the same dimensions.

Since individuals have diverse treatment options available, it is relevant to gain insight into the determinants that individuals deem important for mental health interventions and analyze to what extent intervention modalities are expected to fulfill these needs. In 2014, Musiat and colleagues designed a study to develop a list of evaluation dimensions which influenced people's decision to engage with a particular intervention for mental health problems (Musiat et al., 2014). They subsequently investigated to what extent different interventions fulfilled participant's needs. Their findings indicated that face-to-face interventions were expected to perform well in terms of helpfulness, personal support, credibility, motivational aspects, suiting learning preferences, including feedback, appeal, and credibility. Books, websites, and apps performed well in terms of

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convenient location and time, anonymity, and no waiting time but were rated poorly on all other dimensions. This also resulted in the highest likelihood of using face-to-face interventions, followed by self-help books and web-based interventions. Smartphone applications showed the lowest likelihood of use.

The study by Musiat et al. (2014) is one of the few studies incorporating such a differentiated assessment (grounded in service users' needs) of multiple intervention modalities. However, the position of technology in society has altered and the COVID-19 pandemic has resulted in large number of potential first experiences with digital mental health (Parsons et al., 2023), and a decade later, an update of the work of Musiat et al. (2014) seems warranted. Therefore, the aim of this study was to (1) gain insight into the importance of different evaluation dimensions for mental health interventions, (2) assess to what extent individuals from a general and student population expect different intervention options (self-help books, digital interventions, blended counseling, and face-to-face counseling) to meet their expectations, and (3) compare the self-reported likelihood of use between these intervention modalities (including an exploratory subgroup analysis for existing mental health complaints).

Method

Participants

First-year applied psychology students at Thomas More University of Applied Sciences in Belgium (aged 17 or older) were invited for participation in the study through e-mail and received course credits for their participation. Additionally, a call for participation was launched in the general population through social media and e-mail. Recruitment took place in November and December in 2023. The study was approved by the Ethical Committee of Thomas More University of Applied Sciences (ECTP2324_03). All participants provided informed consent.

Questionnaire

The questionnaire was adapted from Musiat et al. (2014) and was distributed (in Dutch) via a link to an online survey platform QuestionPro (https://www.questionpro.com/). Besides the translation, the questionnaire underwent some alterations based on progression in the field regarding the intervention options. The included intervention options were slightly modified to better represent current digital mental health use. Web-based interventions and smartphone applications were merged into a single intervention option, 'digital interventions,' since they are applied in a similar way (in the capacity of (guided) self-help) and the difference between these options has grown smaller due to the rise of mobile website traffic and mobile-first web design. Blended counseling, i.e., combining face-to-face and digital interventions, is a newly added intervention option.

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Self-help books and face-to-face counseling were retained. The 12 evaluation dimensions, which Musiat et al. (2014) developed based on an advisory group of service users, were retained, although learning style was translated to 'matching one's own learning process' to facilitate comprehension by the participants.

Participants were asked to what extent they found 12 criteria or dimensions important, on a 7-point Likert scale ranging from 1 (totally unimportant) to 7 (very important), when looking for help in the broad context of interventions for common mental health problems such as anxiety or depression. These dimensions relate to both the content of the intervention or practical considerations. Dimensions considered that the intervention (1) helps with the problem, (2) motivates to get better, (3) is credible, (4) is accessible without waiting time, (5) is accessible at an appropriate time, (6) provides feedback, (7) includes personal support, (8) is accessible at a convenient location, (9) is free of charge, (10) is attractive/appeals to me, (11) can be consulted anonymously, (12) connects to my own learning preferences (mainly referring to how individuals prefer to process information). As a next step, they rated to what extent they thought that face-to-face counseling, a self-help book (without additional support), blended counseling, and a digital intervention would meet these criteria (on a scale from 1 to 7). The descriptions of the four intervention options, which were provided to the participants, can be found in Table 1. Participants subsequently rated the likelihood of using these modalities ("How likely is it that you would use the following applications?") on a 6-point Likert scale ranging from 0 (very unlikely) to 5 (very likely).

Participants were asked to report whether they currently or previously faced mental health problems and had experience with one or more of the four intervention options mentioned above. Finally, the questionnaire also asked for demographics (gender, age, educational level) and included a question about the frequency of using the internet and different devices (smartphone, computer or laptop, and tablet) to provide an indication of participants' familiarity with technology use.

Analysis

The data was analysed using SPSS 29. Individuals with incomplete questionnaire responses were excluded. The data was non-normally distributed according to visual inspection of the data and Kolmogorov-Smirnov Tests of Normality, so non-parametric tests were used. Related-Samples Friedman's Two-Way Analysis of Variance by Ranks and Dunn's Pairwise Post Hoc tests were used to compare the importance of the dimensions and the ratings between modalities. An Independent-samples Mann-Witney U test was used to in an exploratory analysis to compare between subgroups. The alpha error probability used to test statistical significance was .05 and *p*-values were adjusted by the Bonferroni correction for multiple tests.

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Table 1

Descriptions of the Four Intervention Modalities

Modality	Description
Face-to-face counseling	Face-to-face counseling is when counseling takes place in person. As a client, you see the counselor in the same physical space. You do not use technological aids in the process.
Self-help book	A self-help book is scientifically based and offers insights into problems or challenges that you are struggling with. A self-help book often includes strategies on how to learn to cope with your symptoms. A self-help book can be used alongside other forms of therapy, or on its own[a].
Blended counseling	Blended counseling is a counseling service that combines face to face and technological interventions. For example, as a client, you regularly see the health professional physically. In addition, you occasionally have conversations via computer (through online consultations). Between sessions, you can also call on a website or smartphone app for additional support.
Digital intervention	In a digital intervention, you receive information, advice or support through a website, app or online platform. You learn more about complaints or problems, complete a self-test, or carry out assignments. In some digital interventions, you also receive remote support (e.g., a health professional who supports you via chat), but this is not always the case.

[a]Participants were asked to reflect on stand-alone implementation of the self-help book for the ratings.

Results

Sample

While 354 individuals accessed the questionnaire, a large number of incomplete responses resulted in a total of 232 participants from a general (n = 106; 46%) and college student (n = 126; 54%) population being included. Table S1 in Supplementary Materials provides an overview of the demographics. Apart from age and education, the subsamples differed in tablet usage and gender. Smartphone, internet, and computer or laptop use were high in the sample (ranging from regularly to very often). Despite this being a general population sample, 65.5% of respondents reported current or past mental health problems. However, almost none had experience with any of the four intervention modalities. One participant had experience with face-to-face counseling, and two others had used a self-help book. No experience with digital or blended help was reported.

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Importance of the 12 Dimensions

Table 2 provides an overview of the median and mean importance rating assigned to the different dimensions. All dimensions were deemed important, apart from perceived costs ('free of charge'), which received a more neutral score. Related-Samples Friedman's Two-Way Analysis of Variance by Ranks ($\chi^2(11) = 610.20$, $p < .001$) showed significant differences between the importance of the dimensions. Helpfulness, personal support, motivation, and credibility were deemed the most crucial, with their importance differing significantly from other dimensions, but not among these four. On the other hand, being free of charge was rated significantly least important of all the dimensions. Full results of the Dunn's Pairwise Post Hoc tests for each dimension can be found in Table S2 in Supplementary Materials.

Table 2

Subjective Importance Ratings for the 12 Dimensions

	Importance	
Dimension	***Mdn***	***M* (*SD*)**
Helps with the problem	7	6.43 (0.84)
Includes personal support	6	6.24 (0.84)
Motivates to get better	6	6.20 (1.01)
Is credible	6	6.12 (1.01)
Is accessible without waiting	6	5.87 (1.03)
Is accessible at an appropriate time	6	5.84 (1.03)
Provides feedback	6	5.61 (1.05)
Is accessible at a convenient location	6	5.53 (1.12)
Connects to my own learning	6	5.47 (1.12)
Can be consulted anonymously	5	5.15 (1.61)
Is attractive/appeals to me	5	5.11 (1.33)
Is free of charge	4	4.53 (1.37)

Note. Scale from 1 (totally unimportant) to 7 (very important).

Expectations Regarding the Four Modalities

Participants rated the four different intervention modalities on the 12 dimensions. Table 3 provides the scores and Figure 1 provides a visual overview of results. Significant differences in terms of expectations across the intervention options were reported on all dimensions, $20.48 \leq \chi^2s(3) \leq 456.27$, $ps < .001$ (specific test results can be found in Table S3 in Supplementary Materials).

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Table 3

Median and Mean Scores of the Extent to Which Treatment Options Are Expected to Meet Expectations on Each Dimension

	Self-help book		Digital intervention		Blended counseling		Face-to-face counseling	
Dimension	***Mdn***	***M* (*SD*)**	***Mdn***	***M* (*SD*)**	***Mdn***	***M* (*SD*)**	***Mdn***	***M* (*SD*)**
Helps with the problem	5	4.38 (1.492)	5	5.00 (1.348)	6	6.01 (1.017)	7	6.47 (0.732)
Includes personal support	2	2.85 (1.692)	5	4.63 (1.573)	6	6.05 (1.084)	7	6.41 (0.930)
Accessible at convenient location	6	5.63 (1.466)	6	5.78 (1.282)	6	5.62 (1.211)	5	5.25 (1.331)
Accessible at appropriate time	7	6.11 (1.331)	6	5.85 (1.216)	6	5.54 (1.187)	5	4.64 (1.627)
Can be consulted anonymously	7	6.12 (1.306)	6	5.69 (1.437)	4	4.08 (1.815)	4	3.57 (1.930)
Free of charge	4	3.47 (1.736)	5	5.12 (1.481)	4	3.94 (1.541)	3	3.36 (1.725)
Motivates to get better	5	4.73 (1.537)	5	4.88 (1.425)	6	5.92 (1.027)	6	6.33 (0.788)
Connects to own learning preferences	4	4.04 (1.631)	5	4.63 (1.524)	6	5.40 (1.237)	6	5.82 (1.062)
Provides feedback	2	2.87 (1.746)	5	5.00 (1.372)	6	5.82 (1.077)	6	6.09 (0.969)
Attractive/ appeals to me	4	4.03 (1.849)	5	4.44 (1.602)	5	5.08 (1.400)	6	5.50 (1.269)
Credible	5	4.62 (1.650)	5	4.81 (1.474)	6	5.77 (1.156)	6	6.33 (0.765)
Accessible without waiting	7	6.21 (1.352)	6	5.75 (1.316)	5	5.05 (1.450)	4	3.98 (1.868)

Several dimensions relate to the content of the intervention, namely helping with the problem, motivating to get better, including personal support, providing feedback, connecting to one's own learning preferences, attractiveness, and credibility. Pairwise comparisons were significant for helpfulness, where face-to-face was rated highest, followed by blended interventions, digital interventions, and self-help books. For personal support, face-to-face and blended interventions were rated similarly and higher than digital interventions. Self-help books were again rated least favorably. Pairwise comparisons for the motivational nature of the interventions showed the highest ratings for face-to-face, followed by blended interventions, with digital interventions and self-help books sharing the third rank. Face-to-face interventions connected most to learning preferences, followed by blended interventions, digital interventions, and self-help books (all pairwise comparisons were significant). In terms of including feedback, face-to-face and blended interventions were rated similarly and higher than digital interventions, followed by self-help books. In terms of appeal, face-to-face and blended interventions shared the first rank, followed by digital interventions and self-help books sharing the second rank. The most credible intervention option is face-to-face, followed by blended interventions, and finally digital interventions and self-help books (which shared the third rank).

Other dimensions are linked to implementation and practical considerations, specifically waiting time, accessibility at an appropriate time or location, anonymous consultation, and perceived affordability. Pairwise comparisons for the convenient location dimension showed higher ratings for self-help books and digital interventions compared

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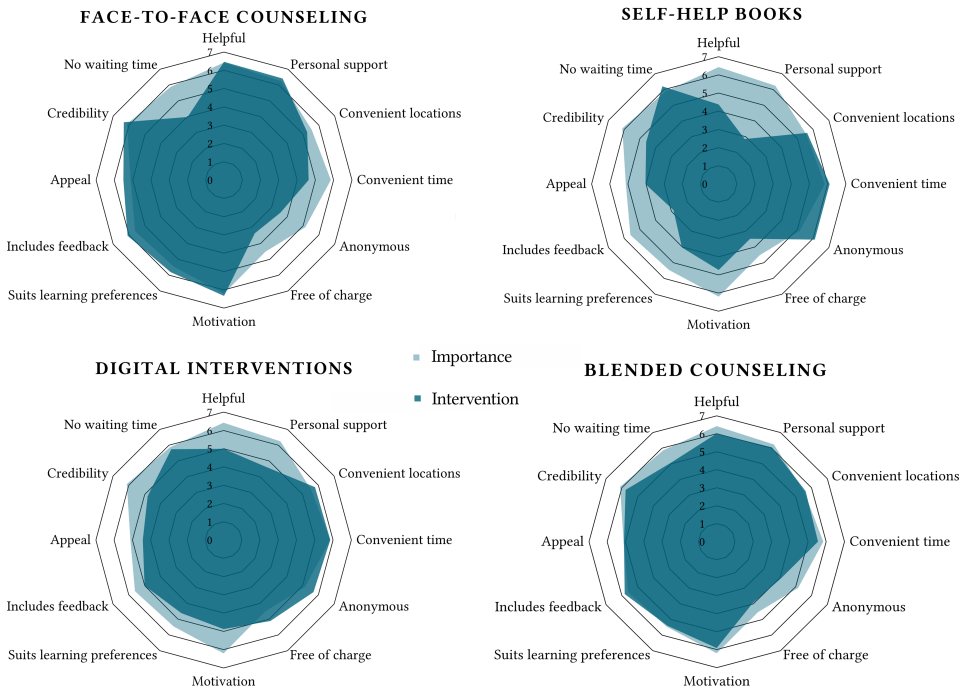
Figure 1

Spider Diagrams Combining Importance and Expectations Ratings for the Four Modalities



to face-to-face counseling. All pairwise comparisons, apart from blended counseling vs. digital interventions, were significant for the convenient time dimension and showed the best ratings for self-help books, followed by both digital and blended interventions, with the lowest rating for face-to-face interventions. For anonymity, both self-help books and digital interventions were rated highest (and did not differ significantly from one another), followed by blended and face-to-face interventions (which also did not differ significantly). In terms of being free of charge, pairwise comparisons showed the highest ratings for digital interventions, followed by blended interventions, and finally self-help books and face-to-face interventions (the latter two did not differ significantly). Pairwise comparisons for waiting time were all significant and indicated the following order: self-help books, digital interventions, blended interventions, and face-to-face interventions.

Taken together, face-to-face counseling and self-help books generally showed opposite patterns in terms of favorable dimensions. Face-to-face counseling met the participants' needs (i.e., was rated higher than 4) regarding helpfulness, motivation, credibility,

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including feedback, personal support, convenient location, appeal, and learning preferences. For affordability, anonymity, and (to a lesser extent) waiting time expectations were not met. Self-help books were rated very favorably on anonymity, waiting time, accessibility at a convenient time and location. However, they showed the least favorable ratings for many other dimensions and did not meet the needs for feedback, personal support, and being free of charge. Similar to face-to-face counseling, blended counseling met the participants' needs for helpfulness, motivation, credibility, including feedback, personal support, convenient location, appeal, and learning preferences (although face-to-face counseling was rated higher for helpfulness, motivation, learning, and credibility). The scores for waiting time, convenient time, and affordability were better for blended counseling as compared to face-to-face counseling. Digital interventions were also rated positively on these latter criteria, but had a lower score than blended or face-to-face interventions for helpfulness, motivation, credibility, including feedback, personal support, appeal, and learning preferences.

Self-Reported Likelihood of Use

There were significant differences in self-reported likelihood of use between the intervention modalities, $\chi^2(3) < 239.55$, $p < .001$. Pairwise comparisons showed that participants were most likely to consider face-to-face counseling, followed by blended counseling and a shared third rank for digital interventions and self-help books (Figure 2). Exploration of the data did suggest substantial individual differences in self-reported likelihood of use for the intervention modalities (see also Table S4 in Supplementary Materials).

When comparing individuals with current or past mental health problems ($n = 152$) with individuals without lived experience ($n = 63$), a couple of differences stand out. A larger proportion of individuals with lived experience indicate a higher likelihood of using face to face counseling ($Mdn = 5$; $M = 4.54$, $SD = 0.76$) as compared to those without lived experience ($Mdn = 4$; $M = 4.16$, $SD = 0.90$), $U = 3535.00$, $p < .001$. For digital interventions on the other hand, individuals with lived experience indicate a lower likelihood of use ($Mdn = 3$; $M = 2.71$; $SD = 1.18$) as compared to individuals without lived experience ($Mdn = 3$; $M = 3.13$; $SD = 1.10$), $U = 5772$, $p = .01$. There are no significant differences for self-help books, $U = 4516.00$, $p = .50$, or blended counseling based on lived experience, $U = 5172.00$, $p = .32$.

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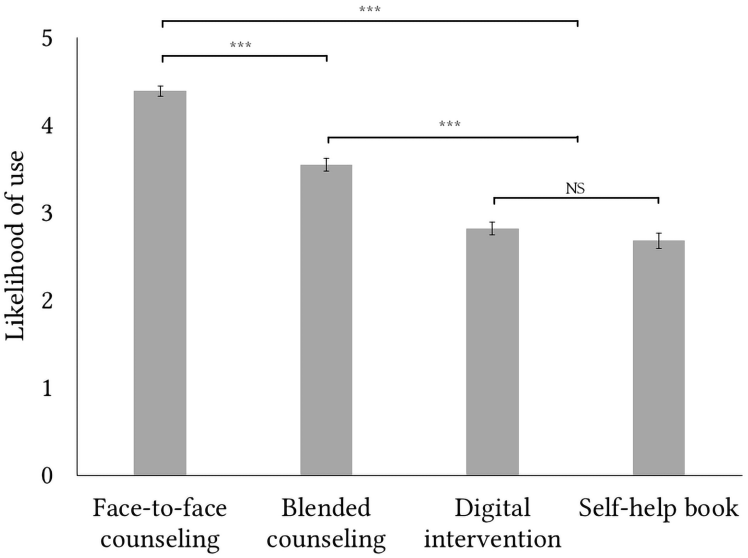
Figure 2

Likelihood of Using an Intervention Modality on a Scale of 0 (Very Unlikely) to 5 (Very Likely)



Discussion

Digital interventions are supported by a growing evidence base and can increasingly become part of accessible and personalized mental healthcare services. It is important to understand how individuals view different intervention options and what their preferences are.

The findings of Musiat et al. in 2014 indicated that face-to-face interventions were expected to perform well in terms of helpfulness, personal support, credibility, motivational aspects, suiting learning preferences, including feedback, appeal, and credibility. Books, websites, and apps performed well in terms of convenient location and time, anonymity, and no waiting time but were rated poorly on all other dimensions. This also resulted in the highest self-reported likelihood of using face-to-face interventions, followed by self-help books and web-based interventions. Smartphone applications showed the lowest likelihood of use. The current study also found relevant differences between face-to-face counseling, blended counseling, digital interventions, and self-help books across twelve evaluation dimensions. Participants indicated that they were most likely to use face-to-face interventions, followed by blended counseling. The results showed that digital and on-paper self-help options were not preferred by the participants.

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The ratings of the twelve evaluation dimensions for mental health interventions showed that helpfulness, personal support, motivation and credibility were deemed very important for intervention selection. The importance of helpfulness aligns with the concept of performance expectancy in the UTAUT model, which has been identified as the strongest predictor of technology use (Venkatesh et al., 2003). Being free of charge showed to be least important according to the participants. Overall, the importance of these dimensions resembles the findings of Musiat et al. (2014). A discrete choice experiment, which forces respondents to make trade-offs, could provide further insights regarding the importance of dimensions. Phillips et al. (2021) already implemented such a design with six attributes (introductory training, human contact, peer support, proven effectiveness, mode of content delivery, and costs) in Germany. In line with our study, they also observed that personal contact with a psychotherapist in blended care and proven effectiveness were highly valued by participants. However, in contrast to our findings, low price was also deemed important.

These dimensions inform on what potential users experience as strengths and limitations of a certain modality and can therefore help researchers, developers and professionals in improving intervention design and enabling informed decision making. To give an example, digital interventions and books do not meet the needs regarding credibility, which implies that implementation can benefit from promoting system credibility in clients, e.g. by relying on the principles of persuasive theory (Fogg, 2002). Strategies (e.g., for raising awareness) should be designed to facilitate informed decision making, ideally participatively with the target groups based on needs and preferences. For instance, Vomhof et al. (2024) showed that medical students found that timing of information (early in their studies) was the most important attribute of an information strategy (more than recommendations or media channels).

Other dimensions might also be relevant for intervention design and predicting intervention acceptance. Pretorius et al. (2019) have suggested that a sense of control over a help-seeking journey and self-reliance might be a motivation for online help-seeking. Sense of control might therefore be an additional dimension that could determine preferences for intervention modality and could be interesting for further research. Stigma or the fear for reactions from others could also influence the help-seeking process (Rowe et al., 2014). Digital health literacy and mental health literacy, as well as previous (online or real-life) help-seeking behavior and experience, can also impact intervention selection. For blended interventions, clinician's attitudes towards new interventions and technologies will also influence patient attitudes and subsequent use (Cohen et al., 2024). Future research should assess which dimensions most strongly predict likelihood of use and actual use of different intervention modalities.

Also similar to Musiat et al. (2014), there was a clear difference in which dimensions were rated positively for face-to-face counseling and self-help books. Face-to-face counseling was evaluated very favorably for the dimensions linked to the content of the

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intervention (e.g., helpfulness, motivation, credibility and personal support), but showed practical limitations (i.e. cost, anonymity and waiting time). On the other hand, self-help books were rated most favorably for many practical circumstances but showed the least favorable ratings for many other dimensions. As compared to self-help books, digital interventions were expected to be significantly more helpful, to include more personal support, to connect to one's learning preferences better, and to include more feedback. This differs from the original study, where digital self-help options (apps and websites) were rated more similar to self-help books. It also differs from De Jesús-Romero et al. (2022) who compared willingness to use self-help books and smartphone applications and found a small preference for self-help books. The study suggested that this preference was influenced by participant education level, perceived availability, and perceived helpfulness of the intervention.

A new category consisted of blended counseling, which was rated fairly similar to face-to-face counseling although self-reported likelihood of use was significantly higher for face-to-face as compared to blended counseling. Blended counseling received a better rating than face-to-face counseling for waiting time, convenient time, and affordability. However, face-to-face counseling outperformed blended counseling in three top-rated dimensions, i.e., it was expected to be more helpful, motivational, credible, which could contribute to a high likelihood of use. The relevance of and preference for face-to-face contact was also documented in a general population (Phillips et al., 2021) and student sample (Kählke et al., 2024) in Germany and could be linked to the way participants are used to receiving mental healthcare (in Europe) and a potential resulting (lack of) concrete understanding of blended care. Additionally, some external factors could contribute to a lack of (intended) use of technology-enhanced mental healthcare, as shown by Butz et al. (2022) who point to factors such as technical or reimbursement issues.

A substantial number of respondents experienced current (29%) or past (36%) mental health problems. Exploratory analyses showed that these individuals indicated a higher likelihood of using face-to-face counseling as compared to those without lived experience (although only one individual had actual experience with this modality). Individuals with lived experience indicated a lower likelihood of using digital interventions than those without mental health problems. This appears to contrast with the findings in the review by Borghouts et al. (2021) which found higher willingness to use digital mental health when symptoms were more severe. However, this review also observed that certain mental health symptoms (e.g., depressive symptoms) can reduce motivation or ability to interact with interventions and severe symptoms can impede actual intervention engagement (Borghouts et al., 2021).

To be able to compare views regarding different delivery modalities, we needed to make abstractions from specific interventions and provide a general description of what a certain modality could look like. Therefore, opinions and preferences were formulated in the context of a (rather abstract) mental health delivery modality while acceptance

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is not a unitary concept. When presenting more concrete interventions (and according intensities and target populations), other preferences might arise. The specific wording used in the descriptions could also impact credibility and other ratings. The current study did not differentiate between guided and unguided digital interventions. Other studies which provided more concrete and tailored information about blended interventions have obtained more encouraging findings regarding the acceptability of blended treatment for first-episode psychosis (Valentine et al., 2020) or depression and anxiety (Braun et al., 2023). It is a limitation that the current study consisted of a sample which is quite young and has very little experience with mental health services despite the relatively large number of individuals with current or past mental health problems. The study combined students and individuals from the general population and we observed differences in gender and tablet use, which is in line with statistics on technology use in Flanders (Northern Belgium) showing elevated tablet use in adults as compared to emerging adults (De Marez et al., 2025). The current study gathered data on the self-reported likelihood of using a certain modality, in line with the 'intention to use' concept as framed in theories such as the UTAUT or the Technology Acceptance Model (TAM; Venkatesh et al., 2003). While it is an extensively investigated construct (e.g., Wei et al., 2024), a gap between intention and behavior has been documented in these theories. Measuring actual use of (self-help) services in a general sample is challenging and requires a longitudinal panel study. Further adding to the complexity of assessing this concept, mere exposure to information in a questionnaire could already result in changed behavior, e.g., registration for mental health programs (Apolinário-Hagen et al., 2023). Factors contributing to intervention selection were rated using Likert scales, which is an approach relying heavily on self-reflection while participants might not always have full insight into one's own decision-making processes. Future research can benefit from going beyond the questionnaire format and could implement (1) qualitative data collection to collect more in-depth information about why certain dimensions are deemed important or why certain modalities are preferred; or (2) discrete choice experiments based on the current and potential additional intervention dimensions, which force respondents to make trade-offs between different features and are less sensitive to bias (e.g., based on social desirability and lacking experience). Investigating perceptions of more concrete interventions (e.g., a guided self-help website for depression) or new technologies (e.g., chatbots) could also be interesting ways to extend the current work.

Conclusion

Taken together, the current study suggests that mere self-help (online or on paper) is not expected to sufficiently meet the needs and is not the preferred choice for handling mental health problems for most individuals. However, participants did show positive views towards digital resources, and a subgroup would likely use the digital and self-help options. If presented with the choice, individuals still prefer face-to-face counseling.

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Nevertheless, our and related work identify blended interventions as a promising treatment option for the future. Informing patients about the available options, underlying mechanisms, and potential added values – a practice shown to increase acceptance in the past (Ebert et al., 2019; Linardon et al., 2022) – remains a meaningful strategy, as does tailoring interventions to patient preferences and needs (Van Daele et al., 2020). While the evidence base and technology for digital mental health services is largely there, it is important to document patient expectations and resulting acceptance.

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Social Media Accounts: *Nele A. J. De Witte:* LinkedIn, *Fien Buelens:* LinkedIn, *Jennifer Apolinário-Hagen:* LinkedIn, *Tom Van Daele:* LinkedIn

Data Availability: The data that support the findings of this study are available from the corresponding author, [NDW], upon reasonable request.

Supplementary Materials

The Supplementary Materials contain additional graphs supporting the findings in the publication, including sample demographics and test results (see De Witte et al., 2025S).

Index of Supplementary Materials

De Witte, N. A. J., Buelens, F., Apolinário-Hagen, J., & Van Daele, T. (2025S). *Supplementary materials to "Attitudes and expectations towards mental health interventions in the general population: Comparing face-to-face counseling, blended counseling, and digital or on-paper self-help"* [Additional information]. PsychOpen GOLD. https://doi.org/10.23668/psycharchives.21309

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Trajectories of Depressive Symptoms and Associated Risk Factors From Late Adolescence to Emerging Adulthood

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Supplementary Materials: Materials [see Index of Supplementary Materials]

Abstract

Background: This study addresses a research gap by identifying depressive symptom trajectories from adolescence to emerging adulthood in a German community sample using a person-centered approach.

Method: The sample consisted of 3,682 adolescents and young adults (49.3% self-identified as female; age at T1: 15–19 years, M = 17.03, SD = 0.88) assessed in seven annual waves of the German Family Panel Pairfam. Latent class growth analysis was conducted with sociodemographic variables (gender, family status, parental education, economic deprivation, immigration background) and depressive symptoms, as assessed by the State-Trait Depression Scales.

Results: Five depressive symptom trajectories were identified: stable low symptoms (34%), intermediate onset with decreasing symptom trajectory (8%), intermediate onset with slow increasing symptom trajectory (46%), intermediate onset with strong increase symptom trajectory (9%) and stable high symptoms (4%). Female gender and economic deprivation were predictors for all four classes associated with higher depressive symptoms with reference to the class with stable low depressive symptoms. Family status and immigration status lost their predictive impact for membership in depressive symptom trajectories when economic deprivation was included.

Conclusions: Interventions should target the underlying etiological factors of female gender and economic deprivation being risk factors for trajectories of depression, taking into consideration the

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complexity and interaction of biopsychosocial and political variables in the development of depressive disorders.

Keywords

depressive symptom trajectories, adolescents, emerging adulthood, risk factors

Highlights

- Five depressive symptom trajectories were identified from adolescence to emerging adulthood (15-25 years) in a German sample.
- Female gender and economic deprivation are risk factors and should be targeted in preventions measures for depression.
- Economic deprivation mediates the effects of family status and immigration status on depressive symptoms.

Emerging adulthood is considered a distinct period between the ages of 18 and 25 years (Arnett, 2000) in which the successful handling and accomplishments of developmental milestones is associated with the transition into adulthood. The conditions under which individuals cope with these developmental milestones serve as risk factors for the development of mental health problems (Baggio et al., 2017; Ladhani et al., 2019). The onset of depression increases significantly in this period with a peak at the age of 15–17 years (Schubert et al., 2017) with prevalence rates of depressive disorders at 3–18% (Kessler et al., 2012; Polanczyk et al., 2015). After the peak in adolescence, depressive symptoms tend to decrease and seem to remain relatively stable during adulthood (Salk et al., 2017). However, these overall trends do not reflect individual trajectories, which may comprise stable courses of high or low depressiveness as well as increases or recoveries. Identifying types of detrimental trajectories, their prevalence, and their related risk factors can provide important information for health services and the development of targeted prevention programs.

Understanding risk and protective factors in the development of depressive disorders is highly relevant, as untreated depressive disorders in adolescence are associated with, among other outcomes, the development of chronic depressive symptoms, suicide, substance abuse, lower educational outcome, and lower income as an adult (Chen & Kaplan, 2003; Hawton et al., 2012).

This is the first study investigating trajectories of depressive symptoms from adolescence to emerging adulthood in a German community sample, where mental disorder treatment is covered by mandatory health insurance. Accordingly, by taking into account dimensional indicators of depressive symptoms and adopting a person-centered approach, we aimed to identify trajectories of depressive symptoms from adolescence to young adulthood and to investigate sociodemographic risk factors for detrimental trajectories.

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Depressive Symptom Trajectories From Adolescence to Emerging Adulthood

Interindividual differences in the dynamics of symptom development over time are best captured by person-centered approaches, which reflect the heterogeneity of symptom development across time. In a systematic review focusing on trajectory studies of depressive symptoms in late adolescence and emerging adulthood (15–24 years), the vast majority of studies found three to four trajectories, with a lower number of trajectories being more likely among younger adolescents (Schubert et al., 2017). In most studies, 40–55% of the assessed subjects fell into the trajectories with stable low or no depressive symptoms (stable low/absence of symptoms). A second reoccurring trajectory was found for a group of subjects (5–15%) with constantly high depressive symptoms (persistent depression/stable high). Furthermore, there was at least one group with less severe and less stable symptoms with varying increasing or decreasing slopes over time. In these intermediate trajectories external factors might play a more important role compared to the trajectories with low and high persistent symptoms (Schubert et al., 2017). Only a few studies investigated trajectories of depressive symptoms from adolescence to emerging adulthood in European samples, where mental disorder treatment is often covered by mandatory public health insurance. Evidence for depressive symptom trajectories has been reported for samples in the United Kingdom (Gaysina et al., 2011; St Clair et al., 2012), the Netherlands (Diamantopoulou et al., 2011; Lubke et al., 2016; Maciejewski et al., 2019), and Sweden (Lallukka et al., 2019).

It is known that specific demographic factors are associated with higher depressive burden. The identification of risk and protective factors might be useful for understanding the etiological factors in different symptom trajectories. Female adolescents, for example, have a higher incidence of major depression, a more chronic trajectory, an earlier age of onset, and a higher increase in depressive symptoms compared to male adolescents (Crockett et al., 2020; Edwards et al., 2014; Hargrove et al., 2020; Mezulis et al., 2014). In a meta-analysis of depressive symptom trajectories in children and adolescents, high or increasing depressive symptom trajectories were also predominantly predicted by female gender (Shore et al., 2018). There is evidence for a decrease of gender differences in emerging adulthood and a stabilization during adulthood (Salk et al., 2017).

Other predictors of increased depressive symptoms in adolescence and young adulthood include lower parental income and poverty, often preceded by lower parental education (Korhonen et al., 2017; Najman et al., 2010; Quesnel-Vallée & Taylor, 2012; Wickrama et al., 2009). However, evidence suggests stronger associations between socioeconomic status and externalizing problems compared to internalizing problems. When family income increased, externalizing symptoms of children (e.g., aggressive behavior) seemed to decrease, but internalizing symptoms persisted (Costello et al., 2003). Furthermore, cross-sectional and longitudinal findings suggest that female adolescents may be more vulnerable to economic deprivation than their male peers regarding their depres-

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siveness (Walper, 2009). Higher education, being associated with higher family income, may also be a protective factor (Mendolicchio & Rhein, 2011).

Family type has also been shown to matter, with results indicating higher depressive symptoms among young people from single-parent households (Björkenstam et al., 2017; Laukkanen et al., 2016; Sieh et al., 2013), whereas living in a two-parent household was identified as a protective factor for developing a depressive disorder (Costello et al., 2008). However, stepfamilies can bear increased risks of children's and adolescents' adjustment problems (Jeynes, 2006). Increased stress in the context of parental separation and/or stepfamily formation and compromised family relationships may contribute to a higher risk of depression (Jensen & Lippold, 2018; Shafer et al., 2017).

Finally, there is evidence that adolescents with an immigration background and those who belong to an ethnic minority experience higher levels of depressive symptoms and an earlier age of onset compared to people with a nonimmigrant background, not only in U.S. samples (Brown et al., 2007; Costello et al., 2008), but also in European samples (Belhadj Kouider et al., 2014). An immigration background and membership in an ethnic minority is considered a risk factor for experiencing acculturation distress, facing discrimination, racism, and struggles in the process of identity development, which are, in turn, associated with an increased risk of the development of depressive symptoms (Desalu et al., 2019; Meca et al., 2019). We sought to replicate these findings in the present study.

Current Study

This is the first study investigating trajectories of depressive symptoms from adolescence to emerging adulthood in a German community sample. The first aim of this study was to investigate whether subgroups of adolescents transitioning into young adulthood differ in their course of depressive symptoms, using longitudinal data drawn from seven annual waves of the German Family Panel (pairfam). Taking prior research (Schubert et al., 2017) into consideration, we expected to identify four to six trajectories, including trajectories with stable low and stable high symptoms of depression and at least two trajectories with intermediate symptoms with variations in slope (*intermediate increasing* and *intermediate decreasing*). A second aim was to analyze whether and to what extent sociodemographic variables that have been identified as risk factors for depressive symptoms (gender, family type, education, immigration, and economic deprivation) predict trajectory membership. The results of earlier studies led us to expect that female gender, lower level of education, economic deprivation, single-parent and stepfamily status, and immigration background would be associated more with trajectories of higher depressive symptoms with reference to trajectories with no, low, or decreasing depressive symptoms.

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Method

Procedure and Design

Our analyses are based on Waves 2–8 of the pairfam study. A detailed description of the study has been provided by Huinink et al. (2011). The pairfam study started in 2008/2009 with a nationally representative sample of three birth cohorts (1971–1973, 1981–1983, and 1991–1993). A total of more than 12,000 computer-assisted personal interviews for all cohorts were conducted in pairfam's Wave 1 (2008/2009), followed by annual reinterviews. For the present study, only the cohort born in 1991–1993 was considered, as adolescents and their subsequent course of development were our focus. The first wave was not included because depressive symptoms were assessed only from the second wave onward. All participants of the respective birth cohort who completed Waves 2 (15-19 years) until Wave 8 (21-25 years) were considered with a 30% tolerance of missing data (Collins et al., 2001). The sociodemographic predictors were selected according to their last assessment date.

Participants

Participants were 3,682 adolescents and young adults who participated in the pairfam study (49.3% female). Their age ranged from 15 to 19 years in Wave 2, that is, T1 in our analyses (M = 17.03 years, SD = 0.88) with 96.8% of the sample being in late adolescence (16-18 years). At T1, 95.7% of the participants reported living with their parents, and 4.2% had already moved out (three missing values). Most participants were German natives (76.3%), with the remaining having some form of immigrant background (21.9%) or missing data (1.8%). At T1, 7.9% of the participants had left school without a degree or were currently enrolled in a lower-level secondary school (Hauptschule), 34.7% were enrolled in a middle-level secondary school (Realschule), 42.4% were enrolled in a higher level secondary school (Gymnasium), and 15.0% were enrolled in some other type of school. Thirty percent of the parents (Wave 2) had completed a lower education level, 40% a middle education level, and 30% a higher education level. At T1, 65.2% of the youth were living in nuclear families, 11.6% were living in stepfamilies, and 21.3% were living with a single parent (2% missing data). The mean value for economic deprivation was M = 2.3 (SD = 1.0; Range = 1-5) with a median of 2.

Measures

Depressive Symptoms

Depressiveness was assessed using the trait scale of the adapted German version of the State-Trait Depression Scales (STDS; Krohne et al., 2002). The trait scale instructs participants to report how they ''generally'' feel by rating themselves on a four-point frequency scale (1 = *almost never*, 4 = *almost always*). The scales had good reliability

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for all measurement occasions (Cronbach's α ranged from .83 to .90 across waves) and a good external validity (Krohne et al., 2002). A sum score of > 25 with a range of 0-45 is defined as a cutoff for clinically relevant depressive symptoms.

Family Type

Using young people's information regarding their biological parents' partnership and current household composition in Wave 5 adolescents' family type was defined as nuclear (both biological parents living together), single parent (parents separated or one parent deceased, no new partner in the adolescent's household), or stepfamily (parents separated or one parent deceased, new partner in the adolescent's household).

Economic Deprivation

The Economic Deprivation Scale comprises three items indicating the size of the household budget for ordinary living expenses: 1) *We have enough money for everything we need*; 2) *We often have to forego something because we have to watch our budget*; 3) *We are mostly short of money*. The items were derived from the Economic Deprivation Scale described in (Schwarz et al., 1997) and assessed in Wave 4. The response format ranged from 1 (*not at all correct*) to 5 (*completely correct*). Higher scores reflect higher economic deprivation.

Migration Background

Young people and/or their parents who were born outside of Germany and had non-German nationality were considered immigrants (first or second generation). The item was assessed in Wave 2.

Analytic Strategy and Model Building

Analyses were conducted in Mplus Version 7.0 (Muthén & Muthén, 2017) using full information maximum likelihood. We chose the modeling techniques of latent class growth analysis (LCGA) and growth mixture modeling (GMM), to capture heterogeneity of depressive symptom trajectories. The main difference between LCGA and GMM lies in the modeling of the variance for intercept and slope. In LCGA, a special form of GMM, the variance for intercept and slope within the classes is fixed at 0, which allows for fewer parameters to be estimated (Berlin et al., 2014). We estimated a series of models (see Supplemental Table 1) with up to six trajectories for each modeling technique (LCGA vs. GMM). For the selection of the most suitable model, we used multiple fit indices as well as prior empirical evidence (Schubert et al., 2017). The relevant fit indices included information criteria such as the Akaike information criterion (AIC), where better fitting models have a lower AIC. Further, we implemented likelihood ratio tests where we assessed the relative fit of the model by comparing it to structurally similar models with one less class. Entropy was used to assess distinctiveness of classes,

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where higher entropy signals higher distinctiveness and more accurate assignment of individuals to classes (Infurna & Grimm, 2018). Further analyses were performed with R 2022.07.1. Once latent classes were identified, multinomial logistic regression was used to determine whether and to what extend sociodemographic variables predict a trajectory membership (dependent variable). One category of the dependent variable is chosen as the reference category, and other categories are compared to the reference. To correct for multiple comparisons, *p*-values were adjusted using the Benjamini-Hochberg procedure with a False Discovery Rate (FDR) set at 10%. This threshold was chosen in line with common practice in exploratory and multivariate research, where a more liberal FDR is acceptable to increase sensitivity and avoid Type II errors (Benjamini & Hochberg, 1995; Storey & Tibshirani, 2003). The correction was applied across all analyses, including those reported in the Supplementary Materials.

Results

Trajectories of Depressive Symptoms

The model comparisons are shown in Table 1. The entropy values for the LCGA solutions were generally higher than those for the GMM solutions, which speaks for a better assignment of the individuals to the trajectories within the LCGA solutions.

Table 1

Model Comparisons for LCGA and GMM for Depressive Symptom Trajectories

Measure	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6
Linear LCGA						
AIC	23,727.87	18,771.84	17,393.61	16,866.48	16,607.66	16,446.48
BIC	23,793.77	18,846.37	17,486.77	16,978.28	16,738.10	16,595.55
SSA-BIC	23,765.17	18,808.24	17,439.11	16,921.09	16,671.37	16,519.29
Entropy		0.82	0.71	0.68	0.68	0.65
LMR *p*		< .01	< .01	< .01	< .01	.16
Linear GMM						
AIC	16,839.03	16,250.47	16,072.48	16,037.59		
BIC	16,913.57	16,356.06	16,209.13	16,205.29		
SSA-BIC	16,875.44	16,302.04	16,139.22	16,119.50		
Entropy		0.45	0.49	0.51		
LMR *p*		< .01	< .01	.07		

Note. LCGA = Latent class growth analysis; GMM = growth mixture modeling; AIC = Akaike information criterion; BIC = Bayesian information criterion; SSA = sample size adjusted; LMRp = Lo Mendell Rubin likelihood ratio test-*p*-values.

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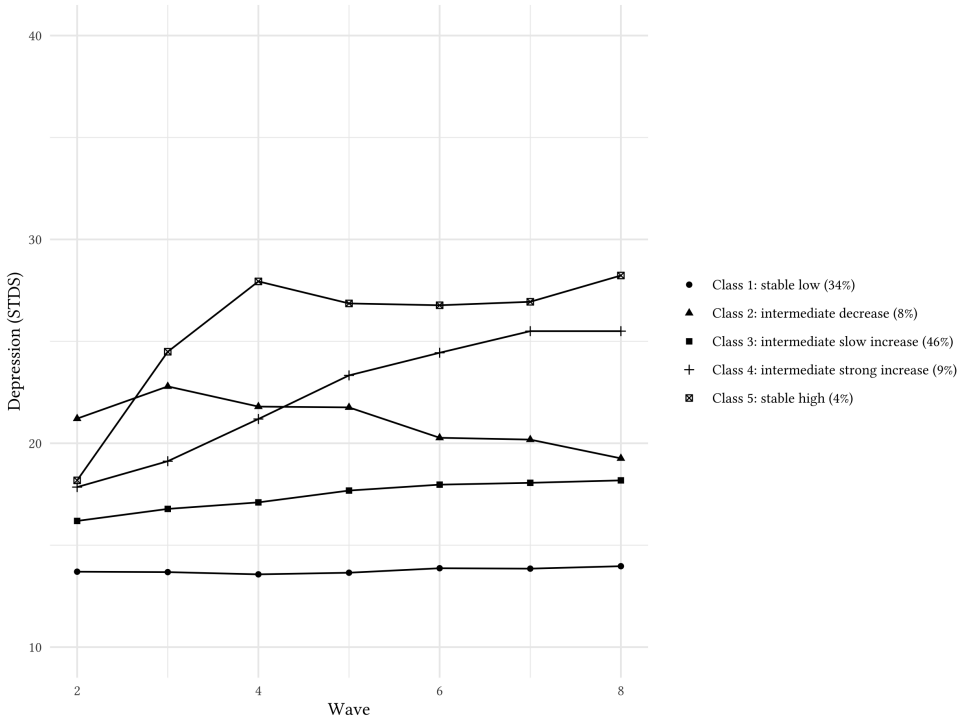
On the other hand, the lower (= better) information criteria (AIC, Bayesian information criterion [BIC], and sample-size-adjusted BIC) within each class were obtained with GMM, which indicates a better model quality. The likelihood ratio tests show that the LCGA approach offers a five-class solution as optimal, whereas the GMM approach produces a three-class solution as most suitable. When analyzing these two models in more detail, only the LCGA solution identified the characteristic trajectories of very high and very low burden. In summary, the entropy and the consistency with previous empirical data support the five-class solution of the LCGA, so the classification of this model was used for further analyses.

Figure 1 shows the final class solution with the associated gradients and the respective sizes of the classes. Class 1 comprises young people with stable low depressive symptoms (34%); Class 5 depicts the small group with stable high depressive symptoms (4%).

Figure 1

LCGA Model of Final Five-Class Solution With Size (%) of Each Class



Note. STDS = State-Trait Depression Scales.

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In addition, three classes have an intermediate starting point at T1, showing either a slight decrease (Class 2: 8%), a slow increase that levels off at the starting point of those with a strong increase (Class 3: 4%), or a strong increase across time that rises up to the level of the stable high group (Class 4: 9%), Class 2 has the highest starting point among all three intermediate groups and drops to a final level close to those with a slow increase.

Predicting Membership in Trajectories by Sociodemographic Variables

Since economic deprivation is associated with family type and immigration status, we first calculated a model without economic deprivation as a predictor variable (see Supplemental Table 2). The group with stable low symptoms was used as a reference group. Female gender was a significant predictor for all four classes associated with depressive symptoms. Living in a stepfamily and having an immigration background were predictors for membership in the groups with strongly increasing symptoms and chronic trajectory. Living in a single-parent family was also a predictor for a chronic trajectory. Multicollinearity was low with a variance inflation factor (VIF) ranging from 1.64 to 4.27, with a model fit of AIC = 4,969.26.

Second, we included economic deprivation in the model with a better model fit of AIC = 3,764.56 and revealed high multicollinearity with a VIF of 9.90.

Table 2 reports the descriptive statistics of sociodemographic variables for each trajectory. The results of the four multinomial logistic regressions for all four models with odds ratios are reported in Table 3, 4, and 5.

Table 2

Descriptive Statistics of Sociodemographic Variables for Each Trajectory

Variable	Class 1 Stable low	Class 2 Intermediate decrease	Class 3 Intermediate slow increase	Class 4 Intermediate strong increase	Class 5 Stable high
N	1,241	292	1,678	317	154
Gender (% female)	40	60	50	58	73
Family type (%)					
Nuclear family	56	46	52	45	38
Stepfamily	26	28	31	31	33
Single-parent family	19	27	18	23	28
Parental education level (%)					
Lower	30	33	30	30	34
Middle	40	40	42	43	36
Higher	31	27	28	27	30
Economic deprivation (*M, SD*)	2.17 (0.99)	2.64 (1.07)	2.30 (0.98)	2.70 (1.14)	2.99 (1.09)
Immigration background (%)	19	28	20	25	27

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Table 3

Multinomial Regressions Analyzing Sociodemographic Variables as Predictors of Trajectory Membership: Model 1

	Model 1							
	Class 2 vs. Class 1		Class 3 vs. Class 1		Class 4 vs. Class 1		Class 5 vs. Class 1	
Variable	***OR* [95% CI]**	***p***	***OR* [95% CI]**	***p***	***OR* [95% CI]**	***p***	***OR* [95% CI]**	***p***
Intercept	0.06 [0.03, 0.12]	< .001*	0.74 [0.51, 1.08]	.12	0.05 [0.03, 0.09]	< .001*	0.01 [0.00, 0.02]	< .001*
Gender: female (ref. = male)	2.70 [1.73, 4.20]	< .001*	1.47 [1.16, 1.86]	.01*	2.20 [1.52, 3.18]	< .001*	3.54 [1.97, 6.36]	< .001*
Family type (ref. = nuclear family)								
Stepfamily	0.99 [0.57, 1.72]	.98	1.27 [0.95, 1.69]	.10	1.30 [0.83, 2.01]	.25	1.24 [0.64, 2.38]	.52
Single-parent family	1.19 [0.64, 2.20]	.59	0.86 [0.60, 1.24]	.41	1.20 [0.71, 2.03]	.50	0.94 [0.42, 2.14]	.89
Parental education level (ref. = lower)								
Middle	0.63 [0.38, 1.07]	.09	1.08 [0.82, 1.43]	.57	1.16 [0.75, 1.79]	.50	1.16 [0.60, 2.22]	.66
Higher	0.87 [0.50, 1.51]	.62	1.07 [0.78, 1.45]	.68	1.05 [0.64, 1.74]	.83	1.19 [0.56, 2.53]	.64
Economic deprivation	1.45 [1.17, 1.80]	.001*	1.15 [1.01, 1.30]	.03*	1.43 [0.91, 2.25]	< .001*	2.08 [1.60, 2.70]	< .001*
Immigration background (ref. = no immigration)	1.32 [0.77, 2.25]	.31	1.28 [0.94, 1.74]	.12	1.69 [1.41, 2.02]	.12	1.64 [0.86, 3.14]	.13

Note. Class 1: stable low; Class 2: decrease; Class 3: slow increase; Class 4: strong increase; Class 5: stable high. CI = Confidence interval; *OR* = odds ratio.
*significant results for adjusted *p*-value thresholds.

Table 4

Multinomial Regressions Analyzing Sociodemographic Variables as Predictors of Trajectory Membership: Model 2

	Model 2					
	Class 3 vs. Class 2		Class 4 vs. Class 2		Class 5 vs. Class 2	
Variable	***OR* [95% CI]**	***p***	***OR* [95% CI]**	***p***	***OR* [95% CI]**	***p***
Intercept	12.70 [6.34, 25.43]	< .001*	0.82 [0.35, 1.91]	.65	0.12 [0.04, 0.39]	< .001*
Gender: female (ref. = male)	0.54 [0.35, 0.84]	.001*	0.82 [0.49, 1.36]	.43	1.31 [0.66, 2.60]	.43
Family type (ref. = nuclear family)						
Stepfamily	1.28 [0.75, 2.18]	.36	1.31 [0.70, 2.43]	.39	1.25 [0.57, 2.73]	.58
Single-parent family	0.72 [0.40, 1.32]	.29	1.01 [0.50, 2.04]	.97	0.80 [0.31, 2.02]	.63
Parental education level (ref. = lower)						
Middle	1.71 [1.03, 2.83]	.04	1.83 [1.01, 3.31]	.05	1.82 [0.84, 3.93]	.13
Higher	1.23 [0.72, 2.10]	.45	1.21 [0.63, 2.33]	.57	1.37 [0.58, 3.24]	.47
Economic deprivation	0.79 [0.64, 0.97]	.03*	1.16 [0.92, 1.48]	.22	1.43 [1.06, 1.94]	.02*
Immigration background (ref. = no immigration)	0.97 [0.58, 1.63]	.99	1.08 [0.59, 1.98]	.79	1.25 [0.59, 2.65]	.57

Note. Class 1: stable low; Class 2: decrease; Class 3: slow increase; Class 4: strong increase; Class 5: stable high. CI = Confidence interval; *OR* = odds ratio.
*significant results for adjusted *p*-value threshold.

In Model 1, female gender and higher economic deprivation were significant predictors for all four classes associated with higher depressive symptoms with reference to the

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class with stable low depressive symptoms. Education, family type, and immigration background were not associated with memberships in trajectory classes.

In Model 2, female gender and economic deprivation were associated with a lower likelihood of a slow increase in depressive symptoms (Class 3) with reference to the class with decreasing symptoms (Class 2). Economic deprivation was a predictor for membership in the class with stable high symptoms (Class 5) with reference to the class with decreasing symptoms (Class 2).

In Model 3, female gender and economic deprivation were predictors for being in a trajectory with intermediate strong increasing symptoms (Class 4) with reference to the intermediate slow increasing trajectory (Class 3). In Model 4, odds ratios were non-significant for the trajectory with stable high symptoms (Class 5) with reference to the trajectory with strong increasing symptoms (Class 4).

Table 5

Multinomial Regressions Analyzing Sociodemographic Variables as Predictors of Trajectory Membership: Model 3 and 4

	Model 3				Model 4	
	Class 4 vs. Class 3		Class 5 vs. Class 3		Class 5 vs. Class 4	
Variable	***OR* [95% CI]**	***p***	***OR* [95% CI]**	***p***	***OR* [95% CI]**	***p***
Intercept	0.06 [0.04, 0.12]	< .001*	0.01 [0.00, 0.03]	< .001*	0.15 [0.05, 0.44]	< .001*
Gender: female (ref. = male)	1.50 [1.05, 2.13]	.02*	2.42 [1.36, 4.29]	.001*	1.61 [0.85, 3.03]	.14
Family type (ref. = nuclear family)						
Stepfamily	1.02 [0.67, 1.55]	.93	0.97 [0.52, 1.84]	.94	0.96 [0.47, 1.94]	.90
Single-parent family	1.40 [0.84, 2.32]	.20	1.10 [0.49, 2.45]	.82	0.79 [0.33, 1.88]	.60
Parental education level (ref. = lower)						
Middle	1.07 [0.71, 1.62]	.75	1.07 [0.56, 2.02]	.84	1.00 [0.49, 2.02]	.99
Higher	0.99 [0.61, 1.60]	.96	1.12 [0.54, 2.34]	.77	1.13 [0.50, 2.57]	.77
Economic deprivation	1.47 [1.24, 1.74]	< .001*	1.81 [1.41, 2.34]	< .001*	1.23 [0.93, 1.63]	.14
Immigration background (ref. = no immigration)	1.12 [0.73, 1.71]	.60	1.29 [0.69, 2.41]	.42	1.15 [0.57, 2.30]	.65

Note. Class 3: slow increase; Class 4: strong increase; Class 5: stable high. CI = confidence interval; *OR* = odds ratio.

*significant results for adjusted *p*-value threshold.

Discussion

As expected, LCGAs of longitudinal data on depressive symptoms revealed subgroups of different trajectories, which were in the range of three to six trajectories, as Schubert et al. (2017) review indicated. Specifically, we found five trajectories, including as expected one trajectory with participants who experienced only minimal depressive symptoms (stable low/absence of symptoms) and one trajectory of adolescents who suffered from chronically high depressive symptoms (stable high/chronic). Furthermore, we found, as

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expected, intermediate trajectories with less severe depressive symptoms, which changed across time (negative and positive slopes). When the five trajectories are sorted by size, almost half of the adolescents (46%) reported moderate depressive symptoms with a slow increase across time ("intermediate slow increase"); a third (34%) indicated stable absence or low depressive symptoms (stable low); almost every 10th young person (9%) experienced intermediate depressive symptoms with a strong increase (intermediate strong increase); a similar-sized group (8%) indicated intermediate depressive symptoms tending to decrease; and 4% experienced chronic depressive symptoms (stable high).

In contrast to our study, the majority of previous studies found four trajectories of depressive symptoms in community samples. However, these studies typically started assessments at a younger age, and studies with a starting point at early adolescence (10–14 years) tended to find fewer trajectories compared to studies assessing depressive symptoms between late adolescence and middle adulthood. Additionally, the prevalence of stable high depressive symptoms (4%) was marginally lower compared to other findings (5–15%), which was also the case for the absence of depressive symptoms (34%), which deviated from previous findings (40–55%; Schubert et al., 2017). There is also a great heterogeneity in studies analyzing trajectories of depressive symptoms regarding measures of depressive symptoms, age span, and sociodemographic variables (Schubert et al., 2017). Studies with six trajectories found a trajectory with an adult onset with severe symptoms, however the sample consisted of a larger age span in adulthood compared to our sample.

As expected, trajectories with higher depressive symptoms with reference to a trajectory with the absence of symptoms were associated with female gender, which is in line with previous research (Crockett et al., 2020; Edwards et al., 2014; Hargrove et al., 2020; Mezulis et al., 2014). Female gender was also a stronger predictor for the trajectory of intermediate symptoms with strong increase than for the trajectory of intermediate symptoms with slow increase. Those results are consistent with findings that by late adolescence girls are more likely to develop depression at an earlier onset than boys (Rohde et al., 2013), which might explain the stronger increase of depressive symptoms. In their integrative model to explain gender differences in the prevalence of depressive symptoms, (Hyde et al., 2008) emphasized the interaction between biological vulnerability (e.g., genetic vulnerability, hormonal changes in puberty), affective vulnerability (e.g., temperament), cognitive vulnerability (e.g., negative cognitive style, internalizing of gender stereotypes), and negative life events (e.g., sexual harassment), which were shown in a longitudinal study (Mezulis et al., 2014). Gender stereotypes and unequal gender norms are also associated with depressive symptoms among adolescents (Koenig et al., 2021) and should be considered as etiological factors for gender differences. There is also evidence that youth identifying with male gender report different symptoms (e.g., more attention deficits, anhedonia) compared to youth identifying as female (depressive mood, sleep problems), which might also be a factor in gender differences in depressive

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symptoms (Crockett et al., 2020). Female gender was also a stronger predictor for the trajectory of intermediate symptoms with strong increase than for the trajectory of intermediate symptoms with slow increase. Interestingly, we found that female participants were also more likely to be in the intermediate trajectory with decreasing symptoms with reference to the trajectory with slowly increasing symptoms. The results might indicate that adolescents and young adults with subclinical symptoms of depression who identify as female might have a higher probability of coping with symptoms compared to those who identify as male. One explanation might be that youth identifying as female have a higher probability of seeking help for mental health problems (Zwaanswijk et al., 2003), which in this case might contribute to a decrease in symptoms over time. Furthermore, biological vulnerability might have less impact on transitioning into adulthood (Hyde et al., 2008). Measures should target the reduction of female gender discrimination (e.g. strengthening legal protections, economic empowerment initiatives, cultural and awareness campaigns and political representation).

Exploratively we analyzed if family type was a predictor for trajectories with higher depression levels given that living in a single-parent family has been identified as a risk factor for the development of depressive symptoms (Björkenstam et al., 2017; Laukkanen et al., 2016). When economic deprivation was not included, family status was a predictor for trajectories with intermediate increasing or chronic depressive symptoms. However, this effect disappeared completely when economic deprivation was included as a predictor in the model. Overall, it appears that in our sample, family status and immigration status were not risk factors per se, but only if they were associated with higher economic deprivation. The results are consistent with evidence that family type is associated with variables that might be considered independently (e.g., parental communication, coping with parental separation, lower family income) and that are not valid for every nonnuclear family system. The results are consistent with evidence that a higher risk for depression and behavioral problems is associated with other factors (e.g., children's problems adjusting to divorce-related circumstances rather than the family structure itself; Amato, 2000).

Our findings with regard to the role of parental education differed from expectations based on other research (Korhonen et al., 2017; Quesnel-Vallée & Taylor, 2012), as parental education was not a predictor for trajectories with higher depression levels. The more relevant predictor of trajectories with higher depressive symptoms was economic deprivation, perhaps mediating weak effects of educational resources. As expected, trajectories with higher depression levels were associated with higher economic deprivation (Costello et al., 2003; Wickrama et al., 2009). Participants with economic deprivation were also more likely to be in the group with stable high symptoms than decreasing symptoms, emphasizing the chronicity of stress levels in families with low income (Najman et al., 2010). They were also more likely to be in the group with intermediate strong increasing symptoms than in the group with intermediate slow increasing symptoms

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demonstrating the early impact of economic deprivation. There are multiple reasons why low family income is associated with higher psychopathology. Families with low income report higher stress levels and are more vulnerable to further stress events (e.g., not living in a safe environment) and traumatic events, and there are more limited parenting resources as they also have a higher burden of parental psychopathology (Butler, 2014). The chronicity of stress levels in families with low income was also visible when comparing trajectories with each other, as we found a higher association with the stable high trajectory than in the intermediate decreasing trajectory. There is also evidence that higher socio-economic status is a facilitator for the achievement of developmental milestones associated with transitioning into adulthood, such as educational attainment (Johnson & Reynolds, 2013) and lower socioeconomic status associated with higher resource deprivation such as less parental and financial support (Prince et al., 2018). The findings emphasize the need for further political and societal measures to reduce economic deprivation as a risk factor. Evidence based measures to reduce economic deprivation include the investment in education, expansion of social safety nets, implementing progressive taxation, investment in infrastructure and affordable health care (Banerjee & Duflo, 2011; OECD, 2015). Economic deprivation was also a predictor for a group membership in the intermediate decreasing symptom trajectory with reference to the trajectory with slow increasing symptoms. In addition to the reduction of risk factors, the strengthening of protective factors also plays an important role in coping with higher stress levels. Stable employment and financial security alleviate the stress associated with poverty, reducing the risk of depression in emerging adulthood (Murali & Oyebode, 2004).

The last sociodemographic variable we considered was young people's immigration background, asking if it was associated with trajectories of higher depression levels. Comparable to family status, immigration was no longer a predictor when deprivation was included in the model. Overall, the findings suggest that it is not immigration per se that is a risk factor, but the circumstances associated with it, which should be addressed accordingly to prevent the development of depressive disorders.

Limitations and Strengths

The person-centered approach based on longitudinal data of a community sample, which covered the time span from late adolescence to emerging adulthood, is one particular strength of our study. Although this approach represents a reduction in complexity, as measurement points of depressive symptoms were limited to a 1-year time span, there is evidence that depressive symptoms in adolescents remain rather stable over a 1-year time span (McLaughlin & King, 2015). LCGA is a powerful tool for identifying latent subpopulations (depressive symptom trajectories) within a sample according to patterns of responses to observed variables (Muthén & Muthén, 2017) but class assignment is based on probabilities and may neglect infrequent patterns in the course of depressive

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symptom. Trajectories might also vary according to methodological differences in study design. It can further be discussed whether the low-stable and intermediate-slow increase groups are in fact meaningfully different, as the differences between these two trajectory groups for gender and economic disadvantage are much smaller than for the comparisons between the low-stable group and the other groups. Overall, however, our findings are well in line with previous research and provide new evidence pertaining to the phase from adolescence to emerging adulthood, which represents an important time window of development. Another limitation is the use of the measurement instrument to assess depressive symptoms. A measure that enables greater comparability with other studies (e.g. CES-D) would have been of advantage. We assessed gender, family type, parental education, economic deprivation, and immigration background as predictors for depressive symptom trajectories, but there may be other predictors that were not considered in the current study but could be important in understanding the development of depressive symptoms. Examples include family support, school climate, peer belonging (Gregory et al., 2020), and—not least—treatment use. The analyzed predictors are also not independent of each other. The risk of poverty is higher for single parents and income depends on the level of education (OECD, 2024). The fact that we did not control for possible changes in the predictors (e.g., economic deprivation, family status) across the different waves is also a limitation of the study. Sociodemographic variables do not cover the complexity of risk factors as risks can arise from the interplay of multiple factors within the guise of the analyzed variables. The FDR rate of 10%, which was used for alpha error inflation instead of the more conservative rate of 5%, can also be discussed critically. Although links between trajectories of depressive symptoms and adolescents' help-seeking behavior would be of great interest, such issues require a different strategy of data analysis and will be addressed in future analyses. The data analysis was not preregistered, which should be considered for future analysis.

Conclusion

Understanding trajectories of depressive symptoms as well as risk and protective factors in the development of depressive disorders is crucial for identifying youths at risk for depression and increasing the probability of receiving adequate treatment. Longitudinal data on depressive symptoms in late adolescence transitioning into adulthood have demonstrated heterogeneous trajectories, enabling us to identify female gender and economic deprivation as risk factors for group membership in trajectories associated with higher and more stable levels of depressive symptoms. On an intermediate subclinical level of depressive symptoms, female gender was also associated with a higher probability of membership in a trajectory with decreasing symptoms over time than in one with increasing symptoms, suggesting more protective factors among females for coping with subclinical depressive symptoms. Family status and immigration status were not significant risk factors per se but were instead mediated by economic deprivation. It

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is of great importance to take measures to reduce female gender discrimination and economic deprivation as risk factors to mitigate the risks of developing depressive disorders. Such measures (e.g., political and societal initiatives) should target the underlying etiology of both constructs, taking into consideration the complexity and interaction of biopsychosocial variables. These results also emphasize the need for early detection and treatment of depressive symptoms, especially in the trajectories of stable high and strongly increasing symptoms.

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Ethics Statement: Pairfam was approved by the ethics committee of the Faculty of Management, Economics and Social Sciences of the University of Cologne.

Preregistration: This data analysis was not preregistered.

Reporting Guidelines: This manuscript follows the *APA Journal Article Reporting Standards for Quantitative Research (JARS–Quant),* including the extended guidelines for longitudinal studies.

Data Availability: Data of the pairfam study are available at https://www.pairfam.de on request.

Supplementary Materials

The Supplementary Materials contain the following items (for access, see Pfeiffer et al., 2025S):

- **Supplement 1.** Results of LCGA and GMM Analyses for Depressive Symptom Trajectories This supplement provides detailed results of latent class growth analysis (LCGA) and growth mixture modeling (GMM) examining trajectories of depressive symptoms. For each model specification (linear, latent base course, quadratic, and LCGA linear), the supplement includes density plots, estimated trajectories, trajectories overlaid with raw data, and model fit indices (AIC, BIC, aBIC, entropy, VLMR/LMR *p*-values, and class sizes). These materials offer transparency regarding model selection and facilitate evaluation of alternative class solutions.
- **Supplemental Table 2.** Multinomial Regression Analyses of Trajectory Membership Predictors This table presents results from multinomial regression models examining sociodemographic variables (gender, family type, parental education, immigration background) and treatment use as predictors of depressive symptom trajectory membership. Odds ratios (*OR*), 95% confidence intervals (CI), and *p*-values are reported for each class comparison.

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Index of Supplementary Materials

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Research Articles

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Translation and Validation of the German 12-Item Obsessive-Compulsive Inventory (OCI-12) in Clinical and Non-Clinical Samples

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Supplementary Materials: Code, Data, Materials [see Index of Supplementary Materials]

Abstract

Background: The Obsessive-Compulsive Inventory-Revised (OCI-R) is widely used to assess symptoms of Obsessive-Compulsive Disorder (OCD). Despite its consistent factor structure, criticism on its syndromal validity has been raised. With the recent update of the commonly used diagnostic manuals, hoarding symptoms are now better captured by the diagnosis "pathological hoarding". Furthermore, the neutralising scale suffers from relatively low psychometric properties. Consequently, a 12-item version of the scale (OCI-12), excluding hoarding and neutralising items

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was recently developed in English. The current study examined the psychometric properties of the German version of the OCI-12.

Method: The psychometric properties of the translated German version of the OCI-12 were investigated in a German-speaking sample, consisting of 102 participants with OCD, 69 participants with an anxiety-related disorder, and 248 non-clinical controls.

Results: The German version of the OCI-12 replicated the four-factor structure of the original English version, with a higher order factor of general OCD symptoms. In addition, similar to the original version, the German OCI-12 showed good internal consistency and test-retest reliability, moderate-to-good construct validity, and good-to-excellent diagnostic accuracy.

Conclusion: The German version of the OCI-12 represents a syndromally valid and reliable inventory for assessing OCD symptoms. Psychometric properties are good-to-excellent and comparable to the original English version. The diagnostic sensitivity is good-to-excellent and further supports using the OCI-12 in clinical and research settings.

Keywords

Obsessive-Compulsive Disorder, Obsessive-Compulsive Inventory, OCI-12, validation, diagnostic accuracy

Highlights

- The German version of OCI-12 possesses good-to-excellent psychometric properties.
- The OCI-12 presents a syndromally valid measure to assess OCD symptoms in German.
- Integrating the OCI-12 into routine clinical practice may improve OCD symptom assessment.

Over the last two decades, the most common questionnaire for the assessment of Obsessive-Compulsive Disorder (OCD) symptoms has been the Obsessive-Compulsive Inventory Revised (OCI-R; Foa et al., 2002) and the German version of the OCI-R (Gönner et al., 2007). Consisting of 18 items, the OCI-R assesses OCD symptoms on six dimensions (washing, checking, ordering, obsessing, neutralising, and hoarding). Yet despite its consistent factor structure demonstrated across various languages (e.g., Simos et al., 2019; Solem et al., 2010; Souza et al., 2011) and its frequent use, criticism on its syndromal validity has been raised. Particularly, although hoarding symptoms can still contribute to an OCD diagnosis when driven by obsessions (DSM-5; American Psychiatric Association, 2013, p. 241), hoarding is no longer considered a core symptom of OCD and is now classified as separate disorder (DSM-5; American Psychiatric Association, 2013; ICD-11; World Health Organization, 2019). Moreover, the subscale "neutralising" is limited to phenomena involving numeric content and suffers from low psychometric properties compared to other OCI-R subscales (Abramovitch et al., 2021; Abramowitz & Deacon, 2006; Hajcak et al., 2004).

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With the aim to improve the syndromal validity of the OCI-R and adjust it to the current changes in the DSM-5 and ICD-11, Abramovitch et al. (2021) developed a 12-item English version of the OCI-R, called the OCI-12. The OCI-12 possesses good-to-excellent psychometric properties which were comparable to the original version of the OCI-R. The factor analysis evidenced that the four factors of checking, ordering, washing, and obsessing could explain the data well, with a general factor of OCD being beneficial to account for the covariances between the factors. Furthermore, the OCI-12 was able to differentiate between individuals with OCD and those with an anxiety-related disorder (ARD) or non-clinical (NCC) controls. In summary, the English version of the OCI-12 represents a valuable update of the OCI-R with a syndromally valid assessment of obsessive-compulsive symptoms and symptom dimensions.

The current study aimed to assess the psychometric properties of the German version of the OCI-12 to evaluate its utility in routine care and clinical research. We translated the OCI-12 into German and examined its factor structure, internal consistency, test-retest reliability, construct validity, diagnostic accuracy, cut-off criteria, and severity benchmarks.

Method

Translation Procedure

The translation process of the OCI-12 followed the translation-back-translation procedure as described by Cripps (2017) and added aspects of Beaton et al. (2000). The process is described in Supplement A.

Study Procedure

Three groups of participants were assessed: OCD, ARD, NCC. Individuals in the clinical samples (OCD and ARD) were assessed at a single timepoint (T_1). For test-retest reliability, the NCC sample was assessed at two timepoints (T_1 and T_2), with email invitations sent 14 days apart. At T_1, all questionnaires were administered, whereas only the OCI-12 was administered at T_2.

All questionnaires were administered online via the survey software REDCap (Harris et al., 2009). The study was approved by the ethics committee of the Faculty of Psychology and Educational Sciences of the LMU Munich (03_Mueller_b). All participants provided informed E-consent for data collection.

Participants

For determining the target sample size, we followed the suggestions for minimum sample sizes of MacCallum et al. (1999) and Hair et al. (2019) to ensure that the factor analyses of the OCI-12 could be conducted in the total sample and the subsample of participants

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with OCD. We also referred to previous studies that conducted analyses with similar clinical and non-clinical samples (e.g., OCD: n = 44, clinical control: n = 44, non-clinical: n = 287; Aydin et al., 2014; OCD: n = 107, anxiety disorder: n = 30, depression: n = 40; Fink-Lamotte et al., 2021). Therefore, we predefined samples sizes of 100 participants in the OCD group, 50 participants in the ARD group, and 250 participants in the NCC group. The observed communalities (h^2 = .77 for the total sample; h^2 = .73 for the OCD sample) are on average larger than h^2 = .60, confirming that our sample sizes are adequate for conducting factor analyses in both the OCD and total samples (according to Hair et al., 2019).

Participants were recruited between April 2022 and July 2024. General inclusion criteria were: minimum age of 18 years, no history of mania or psychotic disorders, and no acute suicidality. Further group-specific inclusion criteria are described below. In- and exclusion criteria were checked with dedicated questions and questionnaires in the survey's start.

Clinical Samples

Participants with a primary OCD/ARD diagnosis within the previous six months, based on DSM-5 (American Psychiatric Association, 2013) or ICD-10 (World Health Organization, 1992) criteria, or those undergoing treatment due to OCD/ARD during this period, were recruited from collaborating clinics in Germany and another research project at the LMU Munich (https://osf.io/8gkjc). The diagnosis of OCD/ARD was given by healthcare providers (for participants recruited through cooperating clinics) or with a structured interview (Mini-DIPS, for participants recruited through another project; Margraf & Cwik, 2017).

For OCD participants, inclusion required a Yale-Brown Obsessive-Compulsive Scale (Y-BOCS; Hand & Büttner-Westphal, 1991) total score > 12 or a subscale score ≥ 8 for obsessions or compulsions as an indicator for clinically relevant OCD symptoms (see also Külz et al., 2014, 2019). The Y-BOCS was administered as self-rating (Y-BOCS-SR; Baer, 1993) for participants recruited through cooperating clinics (n = 64) and as interview version (Hand & Büttner-Westphal, 1991) for participants recruited through another project (n = 38). The final sample comprised 102 participants with OCD with Y-BOCS scores indicating moderate symptoms (M = 22.14, SD = 6.08; $M_{\text{ObsessionSubscale}}$ = 11.25, $SD_{\text{ObsessionSubscale}}$ = 3.39, $M_{\text{CompulsionSubscale}}$ = 10.88, $SD_{\text{CompulsionSubscale}}$ = 3.89).

ARD participants were excluded if they had a lifetime diagnosis of OCD. In total 69 participants with ARD fulfilled the inclusion criteria and completed the assessment. The diagnoses were as follows: 28.99% social anxiety disorder, 13.04% generalised anxiety disorder, 31.88% panic disorder, 5.8% agoraphobia, 10.14% post-traumatic stress disorder, 42.03% specific phobia[1].

1) As multiple anxiety disorders could be present at the same time, the percentages exceed 100%.

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Non-Clinical Sample

Non-clinical participants were recruited via the German online panel PsyWeb (Universität Münster, 2025). Participants were screened for major psychological disorders with the simple version of the Web Screening Questionnaire (WSQ; Donker et al., 2009) and excluded if they exceeded any cut-off. Of 906 participants that gave informed consent to participate in the study and publication of their data, 383 filled out the screening questions and fulfilled the inclusion criteria. Of those, a total of 248 participants completed the first assessment, with 163 eligible for test-retest analyses after completing both assessments.

In summary, the final sample consisted of $N = 419$ participants, including $n = 102$ in the OCD group, $n = 69$ in the ARD group, and $n = 248$ in the NCC group. Sample characteristics are presented in Supplement B.

The dataset had also been used in a prior publication (Müller et al., 2025), which investigated the psychometric properties of the four-item ultra-brief Obsessive-Compulsive Inventory (OCI-4) by extracting the items from the OCI-12.

Measures

The reliabilities of the questionnaires used in this study are provided in Supplement C. The psychometric properties of the OCI-12 will be elaborated below.

12-Item Obsessive-Compulsive Inventory (OCI-12)

The OCI-12 is a 12-item self-report questionnaire measuring OCD symptoms and associated distress on a five-point Likert scale [ranging from 0 (not at all) to 4 (extremely)]. Each scale is assessed by three items, such as "I get upset if objects are not arranged properly." for the ordering subscale, "I repeatedly check doors, windows, drawers, etc." for the checking subscale, "I sometimes have to wash or clean myself simply because I feel contaminated." for the washing subscale, and "I frequently get nasty thoughts and have difficulty in getting rid of them." for the obsessing subscale. The German wording of each item and the associated subscales are displayed in Supplement D.

Yale-Brown Obsessive-Compulsive Scale (Y-BOCS)

The Y-BOCS was assessed as a 10-item interview (Hand & Büttner-Westphal, 1991) for participants recruited through another project and as a 10-item self-report measure (Y-BOCS-SR; Baer, 1993) for participants recruited through cooperating clinics. The Y-BOCS assesses the severity of obsessions and compulsions over the past week. Each item is rated on a five-point scale (0 to 4), with higher scores indicating higher symptom severity. While previous studies proposed that the two versions can be used interchangeably (Steketee et al., 1996), more recent investigations showed slightly higher scores in the clinician administered version (Federici et al., 2010; Hauschildt et al., 2019). In

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the current study, the Y-BOCS total scores did not differ significantly between the two administration modalities: Y-BOCS: M = 22.29, SD = 6.44 (completed by 38 participants recruited through another project); Y-BOCS-SR: M = 22.05, SD = 5.91 (completed by 64 participants recruited through cooperating clinics); $t(71.61)$ = -0.19, p = .85.

Dimensional Obsessive–Compulsive Scale (DOCS)

The DOCS (Fink-Lamotte et al., 2021) assesses OCD symptom severity over the past month across four dimensions (i.e., contamination, responsibility for harm and mistakes, symmetry, and unacceptable/taboo thoughts). Each dimension incorporates five items rated on a five-point scale (0 to 4), with higher scores representing higher symptom severity.

Anxiety Sensitivity Index-3 (ASI-3)

The ASI-3 (Kemper et al., 2011) assesses anxiety sensitivity with 18 items rated on a five-point Likert scale [0 (very little) to 4 (very much)], with higher scores representing higher anxiety sensitivity.

Penn State Worry Questionnaire (PSWQ)

The PSWQ (Glöckner-Rist & Rist, 2014) assesses excessive and unrealistic worry using 16-items that are rated on a five-point Likert scale [1 (not at all typical of me) to 5 (very typical of me)], with higher scores indicating higher worry.

Patient Health Questionnaire-9 (PHQ-9)

The PHQ-9 (Löwe et al., 2002) assesses the severity of depressive symptoms throughout the past two weeks with nine items rated on a four-point scale [0 (not at all) to 3 (nearly every day)]. Higher scores indicate more severe depressive symptoms.

Web Screening Questionnaire (WSQ)

The adapted simple version of the WSQ (Donker et al., 2009) contains 13 questions that screen for the most common psychological disorders and acute suicidality. The original version of the WSQ has been validated and deemed as an appropriate screening tool (Donker et al., 2009; Meuldijk et al., 2017).

Analytic Plan

The statistical analyses were performed in *R* Statistics (version 4.4.1; R Core Team, 2024), with significance set at $p < .05$. The R-code is available at OSF (Müller & Cludius, 2024S).

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Confirmatory Factor Analysis

The factor structure of the OCI-12 was investigated by confirmatory factor analyses (CFA) using the *lavaan* package (version 0.6-19; Houben et al., 2015). Both, the four-factor structure (washing, checking, ordering, obsessing) and the four-factor structure including a higher-order factor of general OCD symptoms were investigated. We evaluated goodness of fit using the standardised root-mean-square residual (SRMR), root-mean-square error of approximation (RMSEA), the comparative fit index (CFI), and the Tucker-Lewis index (TLI). The following criteria as indicator for good model fit (Hu & Bentler, 1999; Schmitt, 2011): RMSEA ≤ 0.06; SRMR ≤ 0.08; CFI ≥ 0.95; TLI ≥ 0.95. As the multivariate normality assumption was violated (for mean and variance), we decided to use the "Maximum Likelihood with Robust Standard Errors and Mean-Variance Adjusted Test" in our CFAs. Therefore, all fit indices reported are robust fit indices. We further investigated in separate linear regression models whether each factor of the OCI-12 could predict the corresponding subscale of the DOCS.

Construct Validity

To examine construct validity, correlation analyses were conducted between OCI-12, Y-BOCS, and DOCS (convergent validity) and between OCI-12, ASI-3, PSWQ, and PHQ-9 (discriminant validity). Pearson's correlation coefficients were interpreted according to Cohen (1988).

Reliability

For internal consistency, both Cronbach's α and McDonald's ω were calculated (Dunn, 2014; McDonald, 1999) and interpreted according to Hair (2009). The test-retest reliability of the OCI-12 was investigated with correlation analyses (interpreted according to Cohen, 1988), paired *t*-tests, and the two-way mixed effect intraclass correlation coefficient (ICC; interpreted according to Koo & Li, 2016) between T_1 and T_2 in the NCC sample.

Diagnostic Accuracy

We investigated group differences in the OCI-12 total and subscale scores by means of univariate (ANOVA) and multivariate analysis of variance (MANOVA). Furthermore, we conduced post-hoc Tukey Honest Significant Difference (Tukey HSD).

We investigated the diagnostic accuracy of the total score and each subscale with receiver operating characteristic (ROC) analyses. The area under the curve (AUC) was interpreted according to the criteria by Carter et al. (2016). Cut-off scores were established with the Youden Index (J; Youden, 1950).

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Results

Confirmatory Factor Analysis

Confirmatory Factor Analysis in the OCD Sample

Figure 1A displays the CFA examining the four-factor solution. The Chi-square test, $\chi^2(48, N = 102) = 70.985$, $p = .017$, rejected the hypothesis of a perfect fit. Furthermore, the TLI (0.945) did not support a good model fit while the RMSEA indicated a marginal model fit (0.081; MacCallum et al., 1996). The remaining goodness-of-fit indices supported a good fit of the four-factor model: SRMR = 0.059; CFI = 0.960.

The four-factor model including a higher-order factor of general OCD symptoms is shown in Figure 1B. Aside from the Chi-square test, $\chi^2(50, N = 102) = 71.181$, $p = .026$, and the RMSEA (0.076; reasonable fit; MacCallum et al., 1996), all fit indices support a good model fit: SRMR = 0.058; CFI = 0.963; TLI = 0.951. The first-order factors loaded weakly to strongly on the higher-order factor of general OCD symptoms. The higher-order factor accounted for a significant proportion of variance in the first-order factors checking, ordering, and washing ($R^2_{\text{Checking}} = .791$, $R^2_{\text{Ordering}} = .286$, $R^2_{\text{Washing}} = .148$), but not obsessing ($R^2_{\text{Obsessing}} = .023$).

Confirmatory Factor Analysis in the Total Sample

The path model of the four-factor solution in the total sample is displayed in Figure 2A. As in the OCD sample, the Chi-square test was significant, $\chi^2(48, N = 419) = 80.558$, $p = .002$) and the RMSEA showed only a reasonable fit (0.065; MacCallum et al., 1996). The remaining goodness-of-fit indices supported a good fit of the data: SRMR = 0.043; CFI = 0.979; TLI = 0.972.

Figure 2B presents the path model including the general OCD factor. Except the Chi-square test, $\chi^2(50, N = 419) = 84.168$, $p = .002$, and the RMSEA (0.065; reasonable fit; MacCallum et al., 1996), all fit indices support a good model fit: SRMR = 0.046; CFI = 0.979; TLI = 0.972. In the total sample, the first-order factors loaded strongly on the higher-order factor of general OCD symptoms. The higher-order factor accounted for a significant proportion of variance in all first-order factors ($R^2_{\text{Checking}} = .796$, $R^2_{\text{Ordering}} = .433$, $R^2_{\text{Washing}} = .588$, $R^2_{\text{Obsessing}} = .557$).

Correspondence of OCI-12 Subscales to DOCS Factors

The linear regression models of the four OCI-12 factors predicting each DOCS subscale are presented in Supplement E. Each DOCS subscale significantly and strongly predicted by the corresponding OCI-12 subscale (βs ranging from $\beta = 0.44$ for checking and ordering to $\beta = 0.84$ for washing).

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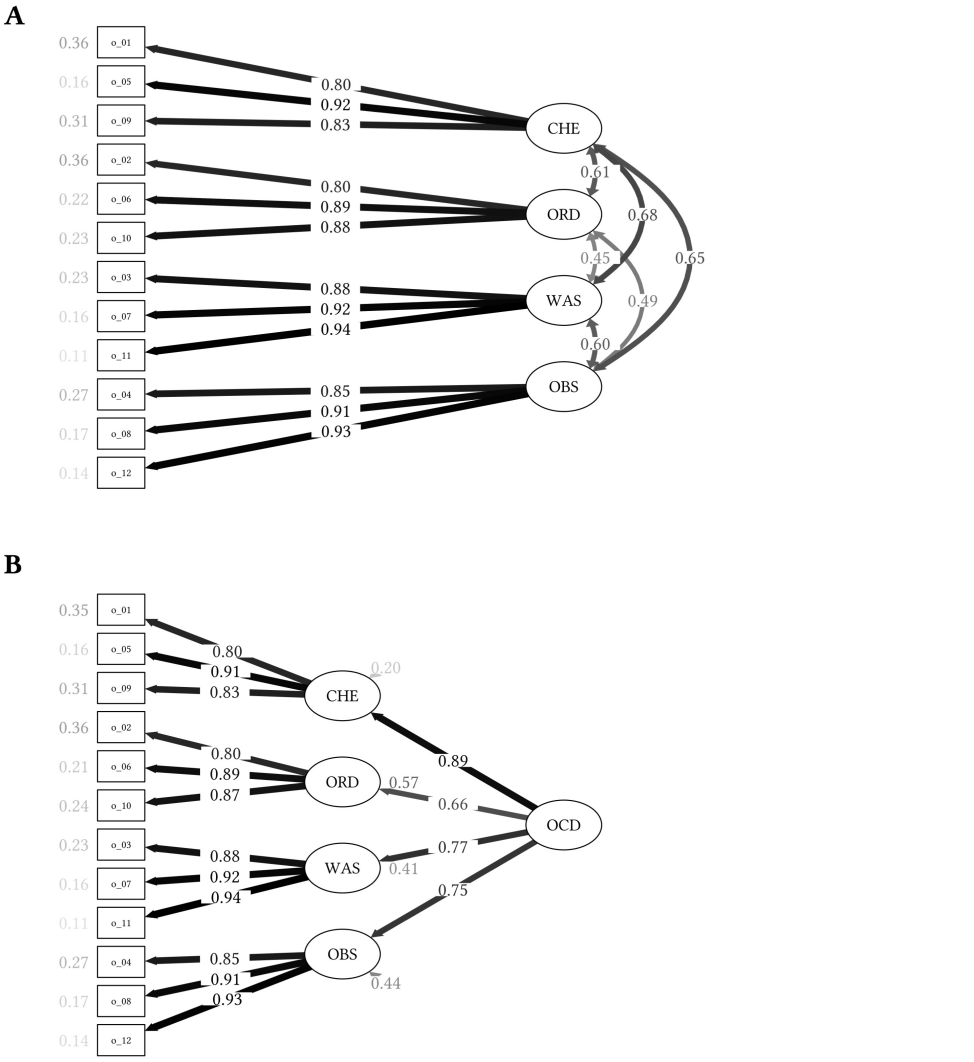
Figure 1

Confirmatory Factor Analyses of the OCI-12 in the OCD Sample (n = 102)



Note. **A.** Path diagram of the structural equation model in the OCD sample depicting the four-factor model. **B.** Path diagram of the structural equation model in the OCD sample depicting the four-factor model including a higher order factor of general OCD symptoms. The factor loadings are presented between the lines, with thicker lines being indicative of higher factor loadings. Residual variances are presented next to the observed items and factors. The shading corresponds to the strength of relationships. Darker paths and values indicate stronger loadings or correlations. OCI-12 = 12-item Obsessive-Compulsive Inventory; CHE = checking subscale; ORD = ordering subscale; WAS = washing subscale; OBS = obsessing subscale; OCD = Obsessive-Compulsive Disorder.

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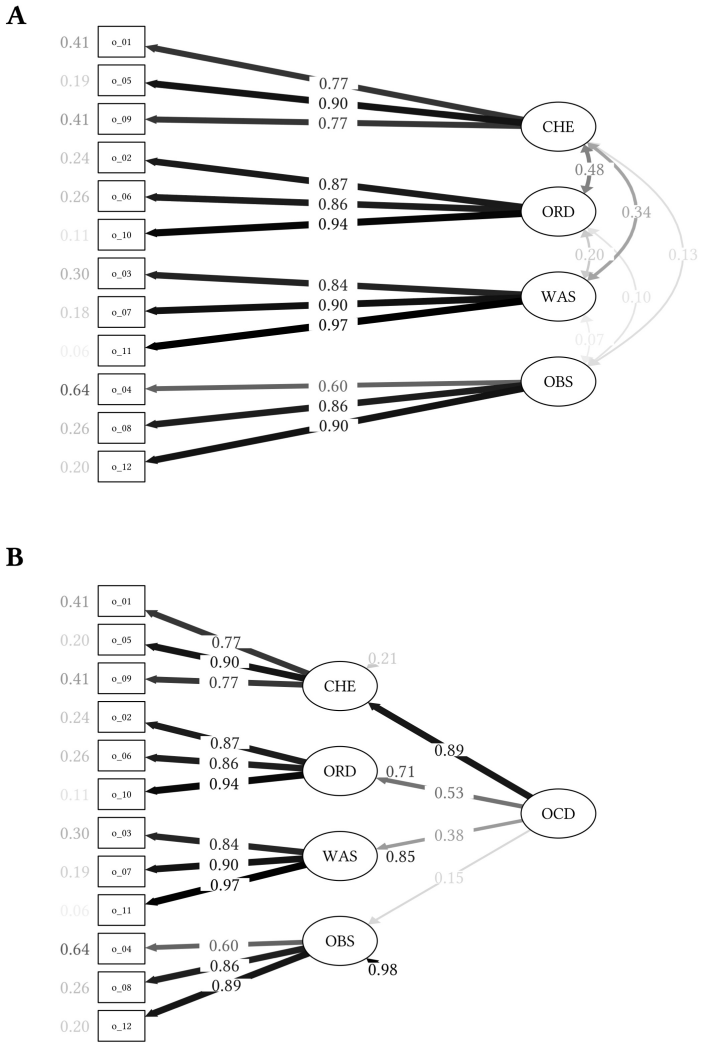
Figure 2

Confirmatory Factor Analyses of the OCI-12 in the Total Sample (N = 419)



Note. **A.** Path diagram of the structural equation model in the total sample depicting the four-factor model. **B.** Path diagram of the structural equation model in the total sample depicting the four-factor model including a higher order factor of general OCD symptoms. The factor loadings are presented between the lines, with thicker lines being indicative of higher factor loadings. Residual variances are presented next to the observed items and factors. The shading corresponds to the strength of relationships. Darker paths and values indicate stronger loadings or correlations. OCI-12 = 12-item Obsessive-Compulsive Inventory; CHE = checking subscale; ORD = ordering subscale; WAS = washing subscale; OBS = obsessing subscale; OCD = Obsessive-Compulsive Disorder.

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Reliability

Internal Consistency

The internal consistency for the OCI-12 subscales in the OCD group ranged from good (obsessing) to excellent (washing; see Table 1). The OCI-12 total showed good internal consistency. In the ARD subgroup, the internal consistency ranged from acceptable (washing) to good (ordering), while the OCI-12 total demonstrated good internal consistency. The NCC group showed the lowest internal consistency, ranging from not satisfactory (checking) to acceptable (obsessing), with the OCI-12 total showing acceptable internal consistency.

Table 1

Internal Consistency of OCI-12 Subscales per Group

	OCD *n* = 102		ARD *n* = 69		NCC *n* = 248	
OCI-12	**α**	**ω**	**α**	**ω**	**α**	**ω**
Checking	.85	.86	.78	.83	.40	.44
Ordering	.92	.92	.87	.87	.79	.70
Washing	.93	.93	.76	.76	.60	.61
Obsessing	.82	.84	.85	.85	.77	.77
Total	.82	.74	.84	.84	.72	.71

Note. OCI-12 = 12-item Obsessive-Compulsive Inventory; OCD = Obsessive-Compulsive Disorder; ARD = Anxiety-Related Disorders; NCC = Non-Clinical Controls.

Test-Retest Reliability

The test-retest reliability of the OCI-12 was assessed over an interval of M = 13.42 (SD = 3.64) days in the NCC group. Results are displayed in Table 2. Results of t-tests indicated no significant changes over the test-retest interval for OCI-12 total and all subscales except for washing, which significantly increased from T_1 to T_2. A strong positive correlation between T_1 and T_2 was shown for the OCI-12 total and a moderate (checking) to strong (ordering, washing, obsessing) positive correlation for the OCI-12 subscales. The two-way mixed effect ICC demonstrated moderate (checking) to good (ordering, washing, obsessing) reliability for the subscales and good reliability for the OCI-12 total score.

Construct Validity

As shown in Table 3, the OCI-12 correlated moderately with the Y-BOCS in the OCD sample and strongly with the DOCS in all groups. The correlations with depressive symptoms, anxiety, and worry were moderate.

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Table 2

Descriptives and Test-Retest Measures of the OCI-12

	T_1		T_2		*t*-Test		Pearson's Correlation		Consistency	
OCI-12	***M***	***SD***	***M***	***SD***	***t***	***p***	***r***	***p***	***F***	**ICC**
Checking	0.80	0.99	0.72	0.96	-1.151	.251	.52	< .001	3.2	.69
Ordering	2.09	1.84	2.24	1.88	1.214	.227	.65	< .001	4.8	.79
Washing	0.33	0.75	0.47	0.96	2.506	.013	.67	< .001	4.7	.79
Obsessing	1.09	1.56	1.18	1.58	0.991	.323	.71	< .001	6.0	.83
Total	4.32	3.42	4.61	3.57	1.323	.188	.67	< .001	5.1	.80

Note. OCI-12 = 12-item Obsessive-Compulsive Inventory; ICC = two-way mixed effect intraclass correlation coefficient. These measures were obtained in the sample of Non-Clinical Controls (n = 163) only.

Table 3

Correlations Between OCI-12 and Measures of OCD Symptoms, Depression, Anxiety, and Worry per Group

	OCD		ARD		NCC	
Measure	***n***	***r***	***n***	***r***	***n***	***r***
OCD Symptoms (Convergent Validity)						
$Y\text{-}BOCS_{Total}$	102	.45	–	–	–	–
$DOCS_{Total}$	102	.74	69	.63	248	.50
Other Symptoms (Divergent Validity)						
PHQ-9	102	.48	69	.29	248	.44
ASI-3	102	.47	69	.37	248	.39
PSWQ[a]	101	.48	65	.30	237	.46

[a]Missing values in the dataset.

Note. OCD = Obsessive-Compulsive Disorder; ARD = Anxiety-Related Disorders; NCC = Non-Clinical Controls; OCI-12 = 12-item Obsessive-Compulsive Inventory; Y-BOCS = Yale-Brown Obsessive-Compulsive Inventory; DOCS = Dimensional Obsessive-Compulsive Scale; PHQ-9 = Patient-Health Questionnaire-9; ASI-3 = Anxiety-Sensitivity Index-3; PSWQ = Penn-State Worry Questionnaire.

Diagnostic Accuracy

Group Differences

Descriptives and group differences on the OCI-12 are presented in Table 4. The total scores of the OCI-12 significantly differed between groups, $F(2, 416) = 373.1$, $p < .001$, as indicated by a main effect of group in the ANOVA. Participants with OCD had significantly higher OCI-12 scores than participants with ARD and NCC, which showed

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significantly higher OCI-12 scores than the NCC group (all p's < .001 in Tukey's HSD tests).

Table 4

Descriptives and Group Differences of the OCI-12

	OCD n = 102				ARD n = 69				NCC n = 248			
OCI-12	***M***	***SD***	***Mdn***	***IQR***	***M***	***SD***	***Mdn***	***IQR***	***M***	***SD***	***Mdn***	***IQR***
Checking	5.26	3.32	5	6	2.06	2.32	1	3	0.79	0.95	1	1
Ordering	4.90	3.52	4	5.75	3.78	3.14	3	5	1.96	1.74	2	2
Washing	5.83	4.41	6	8.75	1.59	2.16	1	3	0.34	0.85	0	0
Obsessing	7.22	3.06	8	4	3.57	2.74	3	5	1.02	1.43	1	2
Total	23.22	9.19	23	12	11.00	7.34	10	10	4.10	3.23	3	4

Note. The values for each subscale can range from 0 – 12. The possible range for the total score is 0 – 48. OCI-12 = 12-item Obsessive-Compulsive Inventory; OCD = Obsessive-Compulsive Disorder; ARD = Anxiety-Related Disorders; NCC = Non-Clinical Controls; *Mdn* = Median; IQR = Interquartile Range.

When considering the OCI-12 subscales, the MANOVA showed a significant main effect of group across the subscales, Pillai's Trace = 0.733, $F(8, 828) = 59.837$, $p < .001$. As for the OCI-12 total score, separate ANOVAs with post-hoc Tukey HSD tests revealed that participants with OCD had significantly higher scores on each subscale than participants with ARD, which showed significantly higher scores than the NCC group (all p's < .001).

Diagnostic Accuracy

The diagnostic accuracy of the OCI-12 to discriminate participants with OCD from participants with ARD was good (AUC = .85, 95% CI [.795, .909]; see Figure 3A). The diagnostic accuracy for each subscale ranged from AUC = .59 (ordering) to AUC = .81 (obsessing; see Figure 4A).

Considering the diagnostic accuracy of the OCI-12 for distinguishing individuals with OCD from NCC's, the OCI-12 total score evidenced excellent accuracy (AUC = .99, 95% CI [.976, .997]; see Figure 3B). The diagnostic accuracy of the subscales ranged from AUC = .75 (ordering) to AUC = .96 (obsessing). Overall, the OCI-12 total score evidenced the best diagnostic accuracy for discriminating OCD participants from both, ARD and NCC (see Figure 4B).

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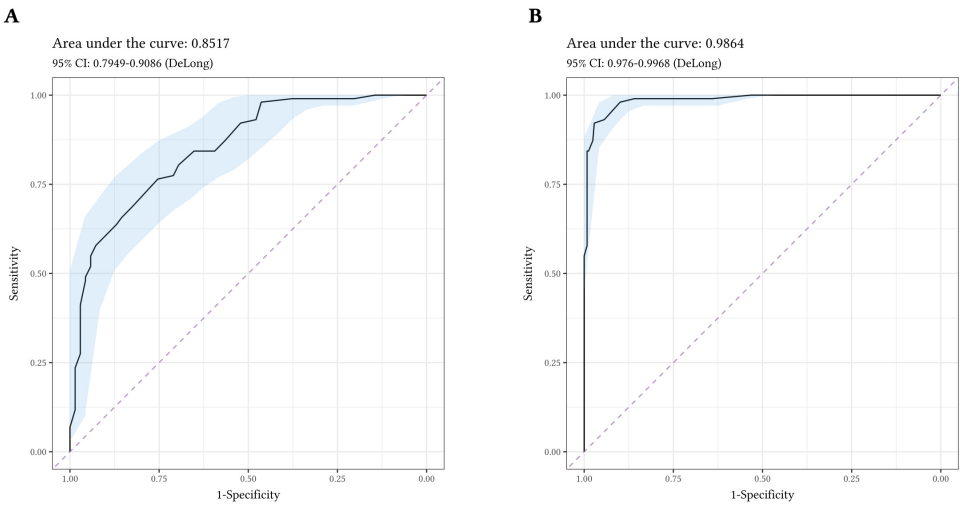
Figure 3

Receiver Operating Characteristic Curves for the OCI-12 Total



Note. **A.** Receiver operating characteristic (ROC) curve discriminating participants with Obsessive-Compulsive Disorder (n = 102) from participants with Anxiety-Related Disorders (n = 69). **B.** Receiver operating characteristic (ROC) curve discriminating participants with Obsessive-Compulsive Disorder (n = 102) from Non-Clinical Controls (n = 248).

Optimal Cut-Off

Table 5 summarises the Youden Indices, sensitivities, and specificities of the OCI-12 total and each subscale for discriminating participants with OCD from ARD and NCC participants. An OCI-12 total score ≥ 17 was considered optimal to discriminate participants with OCD from participants with ARD. When discriminating participants with OCD from NCC's, a score of ≥ 11 was considered optimal. Out of the subscales, the washing subscale could best discriminate OCD from ARD participants, while the obsessing subscale best discriminated OCD from NCC participants. The ordering subscale was suited worst to discriminate participants with OCD from ARD and NCC participants.

Severity Benchmarks

OCI-12 severity benchmarks were investigated in severity-groups based on Y-BOCS cut-offs (Storch et al., 2015; see Supplement F for OCI-12 descriptives per severity group). The OCI-12 total score fairly discriminated mild from moderate cases (AUC = .73, 95% CI [.557, .900]), but only poorly distinguished moderate from moderate-severe cases (AUC = .69, 95% CI [.576, .807]) and moderate-to-severe from severe cases (AUC = .52, 95% CI [.059, .983]).

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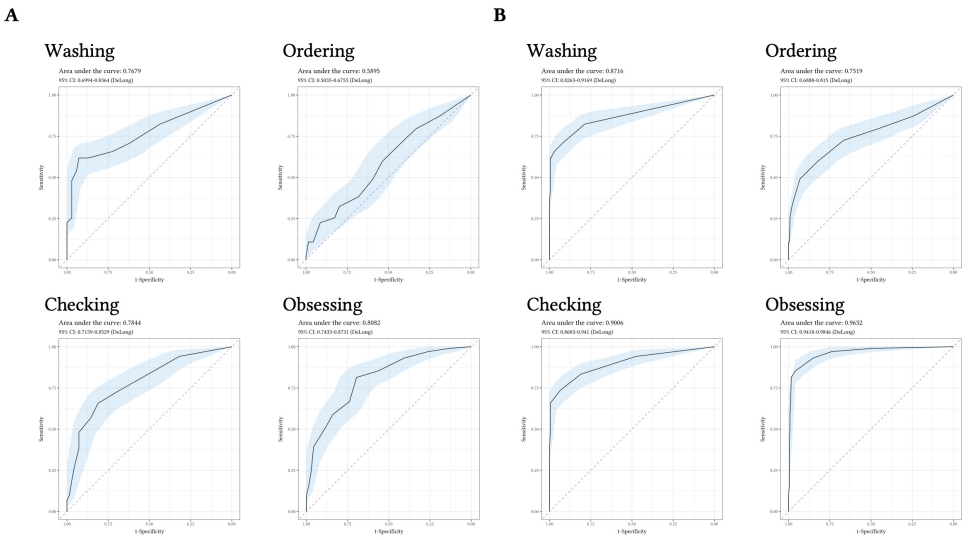
Figure 4

Receiver Operating Characteristic Curves for the OCI-12 Subscales



Note. **A.** Receiver operating characteristic (ROC) curves for the OCI-12 subscales discriminating participants with Obsessive-Compulsive Disorder (n = 102) from participants with Anxiety-Related Disorders (n = 69). **B.** Receiver operating characteristic (ROC) curves for the OCI-12 subscales discriminating participants with Obsessive-Compulsive Disorder (n = 102) from Non-Clinical Controls (n = 248).

Table 5

Optimal Cut-Offs for OCI-12 Subscales

	OCD vs. ARD				OCD vs. NCC			
OCI-12 Subscale	**Cut-Off**	**J**	**Sensitivity**	**Specificity**	**Cut-Off**	**J**	**Sensitivity**	**Specificity**
Checking	4	.47	65.69%	81.16%	3	.67	73.53%	93.55%
Ordering	9	.14	22.55%	91.30%	5	.42	49.02%	93.15%
Washing	5	.55	61.76%	92.75%	2	.63	70.59%	92.34%
Obsessing	5	.51	81.37%	69.57%	4	.81	85.29%	95.97%
Total	17	.52	76.47%	75.36%	11	.89	92.16%	97.18%

Note. OCI-12 = 12-Item Obsessive-Compulsive Inventory; OCD = Obsessive-Compulsive Disorder; ARD = Anxiety-Related Disorders; NCC = Non-Clinical Controls; J = Youden Index; Sensitivity = correct classification of OCD participants; Specificity = correct classification of non-OCD participants.

Given that the severe group included only three individuals, moderate-to-severe and severe cases were combined, but discrimination from moderate cases remained poor (AUC = .69; 95% CI [.577, .801]). An optimal cut-off ≥ 12 was suggested for mild vs.

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moderate cases (J = .38), and a cut-off ≥ 24 for moderate vs. moderate-severe cases (J = .38). Due to small sample sizes and limited discrimination, further research with a larger sample is needed to establish OCI-12 severity benchmarks.

Discussion

To utilise the OCI-12 in German-speaking populations, we translated the original English version (Abramovitch et al., 2021) into German and investigated its psychometric properties. We replicated the original four-factor structure with a higher-order factor of general OCD symptoms. Furthermore, our results on the reliability, validity, and diagnostic accuracy of the OCI-12 are good-to-excellent and comparable to the original English version.

More specifically, the four-factor model (washing, checking, ordering, and obsessing) including the higher-order factor of general OCD symptoms showed a good fit to the data according to the CFAs. The higher-order factor also explained significant variance in the OCI-12 subscales. Of note, the chi-square test and the RMSEA did not support a good model fit. However, both indices are criticised for being sensitive to the sample size (Bollen, 2014; Hu & Bentler, 1999) and the degrees of freedom (Kenny et al., 2015), respectively. As most of the approximate fit indices (i.e., SRMR, CFA, TLI) supported a good fit of the data, we conclude that the four-factor structure with a higher-order factor of general OCD symptoms is also evident in the German-speaking sample. Moreover, each of the OCI-12 subscale significantly and most strongly predicted the corresponding subscale of the well-established DOCS, providing further evidence for the four factors.

The OCI-12 total score's internal consistency and test-retest reliability was good. In terms of construct validity, the current correlation analyses showed only a moderate correlation between OCI-12 scores and the Y-BOCS. This relatively low correlation has also been shown in previous studies (see Abramovitch et al., 2021; Aspvall et al., 2020) and may be related to idiographic nature of the Y-BOCS in measuring OCD symptom severity of individually assessed obsessions and compulsions as compared to the nomothetic approach of the OCI-12. Moreover, the format of administration seems to contribute to the relatively low correlation, hinting towards the *common method bias* (Podsakoff et al., 2003). Indeed, an exploratory correlation analysis showed that the correlation between the two self-reports, OCI-12 and Y-BOCS-SR, was higher (r = .56, p < .001) than the correlation between the OCI-12 and the Y-BOCS interview (r = .28, p = .090). However, in support of convergent validity, the correlation between the OCI-12 and the DOCS is strong. Therefore, we consider the comparably weak correlation with the Y-BOCS rather as a methodological/conceptual artefact. Correlations between the OCI-12 and measures of depression, anxiety, and worry have been moderate, highlighting that the OCI-12 possesses discriminant validity but is not completely independent of these

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symptom measures. Given that the clinical samples present with comorbid diagnoses (e.g., depression), these results are, however, not surprising.

When comparing the OCI-12 scores between the three groups, the group of participants with OCD showed significantly higher scores than both, participants with ARD and NCC. The OCI-12 can discriminate well between participants with OCD and ARD when a cut-off of ≥ 17 is considered and can discriminate excellently between participants with OCD and NCC's when a cut-off of ≥ 11 is used. Of note, the OCI-12 should not be considered as isolated diagnostic tool (i.e., the cut-off criteria should not replace a diagnostic interview). Analyses of the severity benchmarks showed that the OCI-12 could fairly discriminate mild from moderate cases, but only poorly discriminate between cases of mild or severe symptom severity. However, due to the small sample sizes within the severity groups, future research is needed to establish conclusive benchmarks.

Limitations

This study has some limitations. Although participants were recruited within cooperating clinics, structured diagnostic interviews were not always possible, risking less precise diagnoses, particularly for comorbid disorders. Likewise, the absence of structured interviews for the NCC population may have allowed the inclusion of participants with undiagnosed psychological disorders, not captured by dedicated questions or the WSQ.

Furthermore, 63% of participants with OCD filled out the Y-BOCS as self-rating, whereas 37% completed the Y-BOCS interview. While both formats show strong correlations and good reliability and may be used interchangeably (Baer et al., 1993; Rosenfeld et al., 1992; Steketee et al., 1996), the weak correlation between the interview version and the OCI-12 hints towards a *common method bias,* which should be taken into consideration when interpreting the convergent validity. As the correlation between the OCI-12 and the Y-BOCS is affected by the assessment modality, it may be worthwhile in future studies to investigate the correlation between the OCI-12 and other interview-based measures.

Additionally, participants in the clinical samples presented with comorbid disorders. Although this increases the ecological validity of the current validation, comorbid information is not integrated into the psychometric analyses. Therefore, comorbid symptoms may attenuate some of the reported measures (e.g., internal validity, discriminant validity).

Lastly, the sample size of the OCD group should be increased in future studies. While the average item communalities (h^2 = .73) indicate that a sample size of n = 100 is adequate for conducting the CFA according to rules of thumb (Hair et al., 2019), a larger OCD sample may enhance the robustness of findings. The total sample size (N = 419), however, is adequate for conducting the CFA on the OCI-12 which supports the four-factor structure, including the higher-order factor representing general OCD symptoms. A

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valuable next step would be recruiting a large, representative sample, which would allow the development of norms for the OCI-12.

Conclusion

The German version of the OCI-12 presents a syndromally valid self-report measure to assess OCD symptoms which can be used in research and clinical settings. The original four-factor structure with a higher-order factor of general OCD symptoms could be replicated and the OCI-12 possesses good-to-excellent psychometric properties in terms of internal and test-retest reliability and construct validity. Furthermore, the OCI-12 possesses good-to excellent-diagnostic accuracy for its established clinical cut-off values. To enable a wide use of the OCI-12, the German versions of this questionnaire, including the item numbering and scoring guidelines, can be found in Supplement G and in Müller and Cludius, 2024S. As a next step, conducting a study with larger sample sizes would be valuable to establish norms, enabling an even more meaningful and precise interpretation of scores on the OCI-12.

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Ethics Statement: The study was approved by the institutional ethics committee of the Faculty of Psychology and Educational Sciences of the LMU Munich.

Author Note: The present manuscript details the psychometric properties of the German version of the OCI-12. In a separate publication (Müller et al., 2025), we conducted a first investigation of the German four-item ultra-brief Obsessive–Compulsive Inventory (OCI-4), which was derived from the dataset used in this study by selecting four items from the OCI-12.

Social Media Accounts: *Celina Müller:* LinkedIn, Bluesky

Preregistration: Analyses were not preregistered.

Data Availability: The research data, codebook, and code are provided at the Open Science Framework (Müller & Cludius, 2024S).

Supplementary Materials

The Supplementary Materials contain the following items:

- *Research data, codebook, and code* (Müller & Cludius, 2024S)
- *Additional information* (Müller et al., 2025S):
  - Supplement A: Translation Procedure

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- Supplement B: Sample Characteristics
- Supplement C: Internal Consistencies of Questionnaires
- Supplement D: Formulation of OCI-12 Items
- Supplement E: OCI-12 Subscales Predicting DOCS Factors
- Supplement F: Severity Benchmarks
- Supplement G: 12-Item Obsessive-Compulsive Inventory (OCI-12)

Index of Supplementary Materials

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Transdiagnostic Network Mapping of Psychopathology in Daily Life: Rationale and Research Protocol

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Supplementary Materials: Materials, Preregistration [see Index of Supplementary Materials]

Abstract

Background: The burden of mental health problems and the need for more effective interventions is well established. One path towards treatment improvement involves more effective (evidence-based) tailoring, which requires a deeper understanding of differences in individual profiles of psychopathology. The network approach to mental disorders has emerged as a promising framework in this regard, as it sees and assesses psychopathology as individual networks of interacting symptoms and other variables and uses analysis methods that allow fine-grained analyses of (differences in) individual processes.

Method: We describe the protocol of a 6-week ecological momentary assessment (EMA) study in a broad clinical population, designed to capture various transdiagnostic psychopathology relevant states. Participants are Dutch adults (desired = 600) who are currently awaiting intake- or start of treatment for psychopathology. In addition to EMA self-reports, we collect digital phenotyping data, a broad range of baseline data on symptomatology and transdiagnostic traits, and diagnostic classifications after intake. The study's primary aims are to estimate individual- and group networks of psychopathology (identifying), explore what factors can explain individual differences in networks (linking), and identify potential subgroups based on the networks (clustering). Finally, we plan to evaluate the measures and procedures to facilitate future transdiagnostic EMA (network) research.

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Discussion: The prospective study findings have the potential to advance the description, prediction, and assessment of psychopathology and to evaluate the utility of the network framework in achieving these aims. The insights gained may facilitate the evaluation and refinement of current classifications of mental health conditions and alternative transdiagnostic approaches.

Keywords

network approach, mental disorders, ecological momentary assessment, transdiagnostic, individual differences, diagnostic classifications

Highlights

- The network approach is a promising way to conceptualise, study and treat mental health problems.
- However, more research is needed to assess its utility, especially related to dynamic individual processes.
- We present a momentary assessment study protocol for network research in a broad clinical sample.
- Key aims involve mapping and comparing transdiagnostic individual- and group-level networks.

Mental health problems are increasingly recognised as a major global concern, with significant personal and societal impacts across health care, the economy, education, and overall well-being (Prince et al., 2007; Walker et al., 2015; Wu et al., 2023). Although much progress has been made in developing effective treatments for various forms of psychopathology, treatment efficacy and high relapse (~60% within 1 year) leave much to be desired (Clark, 2018; Holmes et al., 2018). The modest treatment outcomes have been attributed to a limited understanding of the structure and mechanisms of psychopathology and treatment processes, together with insufficient translation from research to clinical practice (Holmes et al., 2014; Rief et al., 2024). Beyond general mechanisms, a better understanding of individual differences is also needed for adequate treatment tailoring (Wright & Woods, 2020).

Currently, treatment protocols are mostly based on disorder classification categories (e.g., those of the DSM-5; American Psychiatric Association, 2022) which have been shown to consist of very heterogeneous symptom profiles (Allsopp et al., 2019; Fried & Nesse, 2015; Newson et al., 2021). This means that each individual's profile can be substantially different to that of others sharing the same diagnostic label. Individual profiles also frequently contain characteristics of multiple different disorders (Allsopp et al., 2019; Forbes et al., 2024). Indeed, comorbid diagnoses appear to be the rule rather than the exception (AL-Asadi et al., 2015; Roefs et al., 2022). Yet, much of the evidence used to guide treatment tailoring is based on these categories and often excludes individuals

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with comorbid diagnoses (Shean, 2014), threatening the representativeness of the populations under study. It follows that classification-informed approaches are likely to be suboptimal for many individuals. These issues highlight the need for more individualised (i.e., idiographic) approaches that transcend diagnostic boundaries (i.e., transdiagnostic) to underpin effective treatments that are tailored to the individual, not the disorder.

A novel and promising framework that has rapidly gained traction in recent years and that may be well-suited to address these challenges is the *network approach to mental disorders* (Borsboom, 2008, 2017). Here, the emphasis is on studying idiosyncratic 'systems' of interacting symptoms and other relevant variables rather than typical 'syndromes' or disorder categories presumed to share a common (biological) underlying cause (Borsboom, 2017; Bringmann et al., 2022; Fried, 2022). This protocol paper describes a large-scale ecological momentary assessment (EMA) study in a clinical sample embedded within a larger initiative to evaluate the scientific and clinical utility of this approach (Roefs et al., 2022). In the following, we outline the overarching aims and guiding principles of this study and describe the design and its development, followed by a reflection on the project's strengths and challenges. In doing so, we respond to recent calls for more open and transparent practices in clinical psychology research (Rief et al., 2024) and hope to stimulate and help guide future efforts using EMA and transdiagnostic network approaches in mental health research.

The Network Approach to Psychopathology

The network approach to mental disorders is often described as a paradigm shift in how psychopathology has long been conceptualised, studied, and practised – as it moves away from the prevailing common-cause and latent-variable models. These latter models see the disorder as explaining its symptoms and assume some underlying, often biological, common cause of these symptoms (Roefs et al., 2022). However, diagnostic categories are descriptive labels, not causal explanations (Borsboom & Cramer, 2013), and despite much research, there is little evidence to suggest that specific mental disorders can be predicted or explained by neurobiological factors (Scull, 2021). Nevertheless, this often termed 'medical model' of mental disorders is a prevailing narrative reinforced by leading (mental) health institutions' causal and disease-laden language (Kajanoja & Valtonen, 2024).

Inspired by a wider framework of complex systems science (e.g., Olthof et al., 2023), the network approach sees the symptoms not as outcomes of the disorder or some common underlying cause. Instead, it sees psychopathology as an emergent and dynamic property arising from the symptom interactions themselves (Borsboom, 2008, 2017; Borsboom & Cramer, 2013). Importantly, recent theoretical advances pose that a 'symptom' in this context can be any biopsychosocial element (e.g., emotions, appraisals, behavioural tendencies, contextual factors) that contributes to the development and maintenance of a state of psychopathology, and not only 'symptoms' as defined by

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diagnostic manuals (Fried & Cramer, 2017; Roefs et al., 2022). As such, the network approach is transdiagnostic, seeing each individual's problem as an idiographic system that may contain elements (i.e., *nodes*) associated with various diagnostic labels.

The application of the network approach to mental disorders has sparked much interest among researchers and practitioners (Kashihara et al., 2025; Roefs et al., 2022), and empirical studies utilising it are accumulating quickly. Initial results are promising but also highlight that much work is still needed for the approach to mature and realise its scientific and clinical potential (for reviews, see Contreras et al., 2019; Kashihara et al., 2025; Robinaugh et al., 2020). Importantly, much of the existing empirical work has been cross-sectional. Albeit informative, cross-sectional networks cannot address the dynamic nature of psychopathology or nuanced individual differences in the dynamic interactions that – according to the network approach – drive the disorder (Borsboom, 2017; Bringmann et al., 2022). Although some work has been done using time-series networks (e.g., Levinson et al., 2022; McGhie & McNally, 2025), these studies have primarily focused on a few specific mental disorders. Therefore, more work is needed using time-series data to uncover within-person networks across the broader psychopathology spectrum.

Some first steps have been taken towards this aim through work carried out by members of the Dutch research consortium New Science of Mental Disorders (NSMD), which was set up to advance the study of psychopathology from the network perspective and in which the current project is embedded. Examination of the network structures among undergraduate students with high vs. low levels of general psychopathology revealed consistent differences in node averages, small differences in the structure of average within-person networks, but considerable heterogeneity in individual networks overall (Jover Martínez et al., 2024a, 2024b). The lack of differences in group-level networks, in contrast to the heterogeneity observed in individual-level networks, aligns with prior work to suggest limited translatability from the group to the individual level of analysis (Levinson et al., 2022; Reeves & Fisher, 2020). Other recent work has also found considerable heterogeneity in networks within the same disorder category (i.e., major depressive disorder), even when analysed separately by severity levels (Ebrahimi et al., 2024). These findings highlight the need to study individual– in addition to group-level processes. Further, we propose to start at the individual level and use bottom-up approaches to identify more homogenous groups of psychopathology profiles that better translate to the individuals within these groups. Such subgroups can help evaluate current classification systems and identify common patterns that can potentially serve as more insightful heuristics in clinical practice and research compared to common classifications. To assess this most adequately and stretch the network *mapping* space to a broader range and severity of psychopathology, the next step involves extending this line of transdiagnostic research to a broad clinical population.

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The Network Mapping Study

Central Objectives

The overarching aim of the *Network Mapping Study* (NMS) is mapping (individual) networks of psychopathology in a broad clinical population of individuals awaiting treatment. Through this mapping, we seek to achieve the following three central objectives: (1) *identifying* differences across people in individual transdiagnostic networks of psychopathology; (2) *linking* these individual differences to transdiagnostic traits (e.g., self-control), variables in the external field (i.e., contextual factors, such as social support), and disorder classifications (e.g., DSM diagnoses); and (3) *clustering* individuals based on their networks to see whether network similarities can point to meaningful subgroups and whether network-based clusters overlap with common disorder classifications (e.g., DSM). Table 1 presents an overview of example research questions we aim to examine using these data.

Table 1

Overview of Research Questions

Objective	Example Research Questions
Identifying	• What do individual networks of psychopathology look like in a broad clinical population (i.e., within-person level)? • How do the networks differ across individuals (i.e., between-person level)?
Linking	• How do between-person differences in the networks relate to differences in scores on standard questionnaires of psychopathology, transdiagnostic traits, and other (e.g., contextual) factors (i.e., mediating or moderating associations)? • What are the similarities and differences between network structures of individuals with a similar clinical presentation (e.g., DSM diagnosis)?
Clustering	• Can individual networks be used to derive more homogeneous subgroups based on their similarities through clustering methods? • How do the identified subgroups differ in terms of their network structures, standard questionnaires of psychopathology, transdiagnostic traits, and other (e.g., contextual) factors? • How do the identified subgroups align with common disorder classifications (i.e., DSM diagnoses) and alternative taxonomies of psychopathology (e.g., HiTOP spectra and symptom components; see Kotov et al., 2017)?

Achieving a better understanding of the dynamic interactions of mental health problems in individuals' daily lives and how individuals differ in these processes is an important step in bridging the network-informed understanding of psychopathology and its potential clinical applications. Beyond evaluating the usefulness for advancing mental health science and research practices, the findings can facilitate potential applications of EMA-

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and network-derived insights for diagnosis, case conceptualisation and treatment tailoring; and can help evaluate the viability of such approaches in clinical practice.

Guiding Principles

The main principles guiding our research efforts are four-fold. First, in achieving our primary goal of gaining an overview of what individual networks look like in a wide variety of mental disorders, we strive for both *breadth* – via transdiagnostic measures and a broad range of pathology, and *depth* – via studying idiosyncratic processes. Second, we strive to bridge the *nomothetic* and *idiographic* levels of analysis by studying group– as well as individual networks and focusing both on the trait– and state aspects of psychopathology. We agree with recent calls to distinguish between these levels (DeYoung et al., 2022; Lunansky et al., 2020; Rief et al., 2024) and believe that a holistic picture of psychopathology emerges when the insights gained across levels are integrated. It is clear that processes at the different levels often do not converge (Fisher et al., 2018), not only because of individual differences that get lost when aggregating data but also because different aspects of psychopathology occur at different time scales. Psychopathology is not only a system of daily dynamics in emotions, thoughts and behaviour (i.e., states) but also of a more stable (yet malleable) aspect of the self, reflected in personality characteristics and identity (i.e., traits; Klimstra & Denissen, 2017; Lunansky et al., 2020; Wright & Hopwood, 2022). Thus, we intend to explicitly *link* dynamic state interactions (i.e., captured through momentary assessment) with more stable trait representations of psychopathology (i.e., captured using trait questionnaires). Third, for all analyses of the resulting data, we aim to use state-of-the-art analysis methods, keeping track of the latest developments in network analysis and always striving to use the most optimal and fit-for-purpose methods. This also means considering alternative models (other than networks) in case they turn out to be superior. Importantly, the consortium is devoted to assessing whether there is added value in the network approach, not in *confirming* it. This is directly linked to our fourth principle: to keep sight of the ultimate aim, which is to better explain and predict psychopathology in a way that can be useful for both research and practice, balancing complexity and specificity (*methodological/statistical perspective*) on one hand and practicality and generalisability on the other (*applied/clinical perspective).* To foster such a balanced approach, the consortium comprises statistical scientists, (clinical) psychological scientists, and clinical practitioners who continually share expertise and perspectives.

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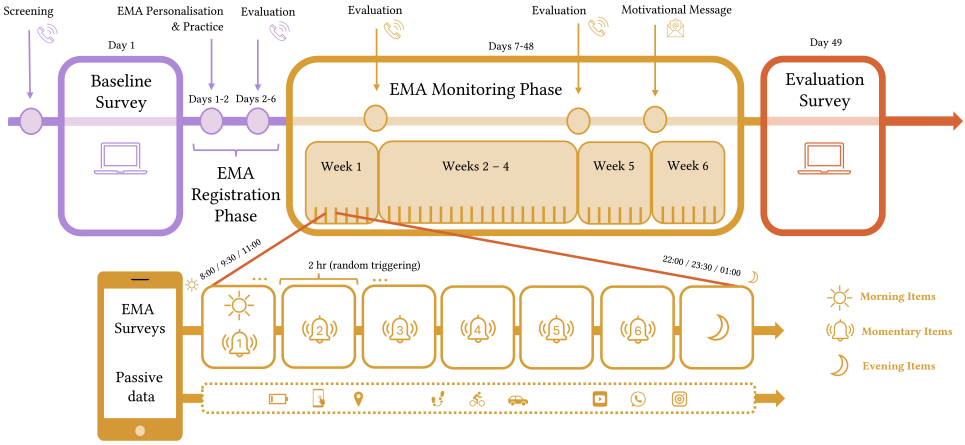
Method

Design

Figure 1 depicts a schematic overview of the study design. The study involves a baseline measure and a 6-week ecological momentary assessment (EMA) protocol in a Dutch clinical population with a wide range of psychopathology. The baseline questionnaire intends to provide a comprehensive picture of psychopathology using common measures of mental disorder symptomatology and various transdiagnostic traits. The EMA consists of brief surveys capturing a broad range of state-like symptoms and contextual variables. In addition, passive data is collected from participants' smartphones during the EMA phase. After the EMA, participants also complete a short evaluation survey asking about their experiences with the study.

Figure 1

Graphical Overview of the Study Design



The design is largely based on a previous study within the consortium (the *Student Mapping Study*; SMS) specifically developed with transdiagnostic network research in mind Jover Martínez et al., 2024a) and validated in a student population (n = 262; Jover Martínez et al., 2025). The EMA battery in the SMS included the full range of psychopathology and was informed by expert opinion collected with a survey and focus groups. Clinicians were queried on the variables most relevant for the mental disorders they specialise in, what transdiagnostic variables they would ask individuals of any disorder and to what extent they believe these variables fluctuate (i.e., momentarily, daily or weekly). We built on and adapted the SMS protocol based on differences in study aims and target

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groups, insights gained from analyses of the SMS data (e.g., compliance, variabilities in item scores), review of the literature, and follow-up expert meetings among researchers with either methodological or clinical backgrounds (mostly within the consortium).

The project is funded by the Dutch Ministry of Education, Culture and Science (NWO gravitation grant number 024.004.016) and received ethical approval by Maastricht University Ethics Review Committee Psychology and Neuroscience (ERCPN; [nr. 225.97.07.2020]). The study complies with regulations at the University of Maastricht and GDPR guidelines. The entire study protocol was preregistered before data collection started (Guðmundsdóttir et al., 2024S). Data collection is currently ongoing (*n* enrolled at submission = 6).

Participants and Recruitment

Participants are individuals referred to the adult care units ('volwassenzorg'; 18-65 years of age) of participating (specialised) mental health care clinics in the Netherlands who are currently awaiting intake- or start of treatment. To participate, individuals need to be proficient in Dutch and own a smartphone. We include the full range of psychopathology and only exclude those who are already receiving treatment elsewhere, those with symptoms that require immediate (crisis) care (e.g., severe suicidality) or that could severely impact the understanding of the EMA items (e.g., symptoms of psychosis). Potentially eligible participants will be informed about the study by the clinics during the registration- and intake phase (through flyers, video, website, information letter, word of mouth). After reading the recruitment materials, individuals express their interest by contacting the research team via phone, email or the project website. After a screening phone call to ensure inclusion and exclusion criteria are met, eligible participants receive a link to the online informed consent form. We will consider additional routes of recruitment if necessary.

Procedure

Participants first complete the (~80 min) online baseline questionnaire, followed by the EMA phase and, finally, the evaluation survey. The EMA phase starts with a registration in which participants respond to a set of questions that will be used to personalise the EMA. This personalisation involves 1) aligning the triggering of surveys to participants' waking times and 2) preventing the inclusion of (almost) completely non-applicable items for specific participants (e.g., purging, wish to die), thus reducing unnecessary burden. Participants proceed with one practice day in which they can get familiar with the protocol before data collection starts.

Through the Avicenna smartphone app (Avicenna Research Inc., 2025), participants are prompted to answer surveys seven times per day for a total of 42 days (294 surveys in total). Each day, participants receive three types of EMA surveys triggered at different

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frequencies: one morning survey, six momentary surveys, and one evening survey. The first measurement of the day includes both the morning survey and the first momentary survey (see Figure 1). The evening survey is triggered separately after the last momentary survey.

The survey notifications are prompted semi-randomly in intervals of 2 hours. For all EMA surveys, participants receive in-app notifications when they are due and reminders when they are about to expire. After the initial prompt, participants have 45 minutes to complete each morning and evening survey but 20 minutes for each momentary survey. Each survey should take about 3-6 minutes to complete, depending on survey type, number of personalised items, and responses to items with skip logic. Participants receive an evaluation phone call after the first and fourth week and a motivational e-mail after the fifth week (in addition to the screening and initial evaluation phone call). To further improve EMA compliance, participants receive reminder e-mails or a phone call when responding deviates from their usual compliance and when responding drops below 50%. Participants are compensated with up to €100 based on compliance with the EMA protocol (€0.33 per EMA survey and €10 for the baseline survey), and those interested can receive a personalised report of their EMA data. During the entire study period, participants can contact researchers if they have questions, and they can withdraw from the study at any time without providing a reason and without any effect on their treatment or waiting time. Waiting time will never be extended for participation, and if treatment starts earlier than anticipated (which we do not expect to occur often considering the standard waiting time and recruitment strategies), participants will, by default, drop out of the study. Participants can continue the monitoring phase at their own wish, but any data collected after the start of treatment will not be used for the primary analyses.

Measures

In the following, we provide an overview of the measurement battery. A comprehensive overview of all measures, scoring information, translation information and references, and a list of all EMA items in both English and Dutch is available in Guðmundsdóttir et al., 2025S-a).

Baseline Measures and Diagnostic Information

The baseline measurement battery consists of demographic and related information and 19 scales measuring psychopathology and transdiagnostic traits. The measures employed are validated scales commonly used to measure symptoms and specific mental health disorders in line with the DSM-5, and wherever possible, validated Dutch translations of these scales. Some scales were translated by the research team (see Guðmundsdóttir et al., 2025S-a). Additionally, we will receive diagnostic and intake information from the

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participating mental health institutions from which participants are recruited. Table 2 contains an overview of the baseline and diagnostic measures.

Table 2

Overview of Baseline Self-Report Measures and Diagnostic Information

Category	Variables
Demographics	Age, gender, nationality
Anthropometrics	Height, weight
Education and employment	Highest achieved level of education, current student status, current employment status
Relationship and children	Current relationship status, number of children
General mental health and treatment	Primary mental health complaint leading to seeking treatment, previous pharmacotherapy, general symptom severity
Measures of specific psychopathology	General depression severity, stress and anxiety, depressive disorder symptoms, attention deficit hyperactivity disorder symptoms, autism spectrum disorder symptoms, disordered eating symptoms, post-traumatic stress symptoms, symptoms of substance use disorders (alcohol and drug use, respectively), obsessive-compulsion disorder symptoms
Transdiagnostic psychopathology	Sexual dysfunction, insomnia severity, levels of personality functioning, dysfunctional personality traits, self-esteem, fear of negative evaluation, dichotomous thinking, self-control, work- and social adjustment, stressful life experiences, trauma
Diagnostic information[a]	Official DSM-5 diagnosis (primary and comorbid classifications), Health of the Nation Outcome Scale (HoNOS+) scores and outcomes, dates of intake, diagnosis, and start of treatment

Note. For the full measurement battery, see Guðmundsdóttir et al., 2025S-a).
[a]reported by mental health institutions.

EMA Items

Items from the SMS were translated and (when applicable) adapted (e.g., due to differences in target population and language, or to improve clarity), and additional items were formulated by a team of native Dutch speakers. In the morning survey, participants rate sleep quality, nightmares, and how they feel about the upcoming day. The momentary surveys are of central interest for network estimation and capture a broad range of transdiagnostic states relevant to modelling psychopathology as a system. Items include

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affective states, physical and physiological states, cognitions, cravings, behaviours and interpersonal context that are likely to show sufficient variability within days, which is necessary for network estimation. The evening survey (like the momentary survey) also consists of psychopathology-relevant states, but ones that either concern specific events, have a low daily base rate, or are less likely to fluctuate throughout the day. For example, participants report their perceived social support, deficits in functioning, (urge to) self-harm or harm others and sense of meaning in life. Here, participants are also asked to report in an open format the most unpleasant and pleasant event that day and when it happened. These items can provide important context for interpreting the momentary patterns at both the within- and between-person levels (e.g., what might explain shifts in patterns across days or stable differences across individuals), even if not used as nodes in the (momentary) networks. Most EMA items are answered on a visual analogue scale (VAS; no tick marks but labels on either side [e.g., "very much" and "not at all"] and a dot with an integer between 0 and 100). The VAS format was preferred over the 7-point Likert scale used in the SMS based on recent (currently unpublished) results suggesting that VAS may be better suited for capturing affective states and in the presence of floor or ceiling effects (Haslbeck et al., 2024).

In addition to the self-report surveys and with the informed permission of participants, passive data is also collected from their smartphones via the Avicenna app. This contains information on their device status, location, motion and app usage (see Table 3). It is emphasised to participants that at no point is the content of their text messages, phone calls, social media or other online activity accessible to the researchers. Table 3 contains an overview of the EMA measures, and the full list of items can be found in Guðmundsdóttir et al., 2025S-a.

Statistical Approaches

The arsenal of network analytic approaches is rapidly growing as the field advances (for a recent overview, see Briganti et al., 2024). For this reason, combined with the exploratory nature of this project, we do not, at this stage, outline in detail or preregister any specific models. Instead, we provide a general summary and examples (see Table 4) for the three central objectives based on the state-of-the-art at the time of writing. For the *identifying,* we plan to estimate individual- and group-level networks using variations of vector autoregressive models (e.g., Bringmann et al., 2013; Epskamp, 2020; Epskamp et al., 2018; Haslbeck & Waldorp, 2020) and assess heterogeneity in individual models (e.g., Hoekstra et al., 2023). For the *linking*, we plan to conduct moderation analyses of the networks (e.g., Haslbeck et al., 2023; Proppert et al., 2025). For the *clustering*, we plan to run data-driven clustering algorithms to derive subgroups based on the networks (e.g., Ernst & Haslbeck, 2025; Gates et al., 2017; Ntekouli et al., 2023; Park et al., 2024). Going beyond the more traditionally used models developed in psychology and psychometrics in the last years, such as the vector autoregressive models mentioned above, we are

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Table 3

Overview of EMA Self-Report and Passive Measures

Category	Variables
Morning	
Sleep	Sleep quality, nightmares
Perceptions about the upcoming day	Nervousness about what could happen during the day, looking forward to the day
Momentary	
Affect states	General negative and positive affect, cheerfulness, sadness, guilt, anxiety, irritability, gloom, loneliness, stress, anger, hopelessness, shame, emptiness*, disgust*
Physical/physiological states	Fatigue, pain or other physical discomfort, nausea*, trembling*, heart palpitations*
Self-satisfaction	Satisfaction with self, satisfaction with physical appearance
Cognition/appraisal	Concentration, worry, intrusive thoughts, specific cravings/urges (e.g., cigarettes, drugs, sex), enjoyment of activity, detachment*
Behaviour	Type of activity engaged in (e.g., work, rest, exercise), giving into/losing control over cravings/urges, avoidance (e.g., thoughts, activities, people), impulsivity, compulsions, body scanning*, scanning environment*
Interpersonal context	Being alone or with others, type of company (e.g., friends, family), enjoyment of company, perceived stress due to company
Evening	
Day reflection	General satisfaction with the day
Cognition/appraisal	Perceived deficits in functioning, perceived social support, perceived meaning in life, wish to die*, urge to self-harm*, urge to harm others*
Behaviour	Self-harm*, aggression*, binge eating*, compensation behaviours*
Daily events	Events perceived as most pleasant and most unpleasant, brief description (open-ended) and timing of these events
Continuous / passive	
Digital phenotyping	Device status (battery status, screen state), location and motion (geolocation, step count and type of activity), frequency and duration of using specific apps [a] (e.g., YouTube, Instagram; but only possible for Android users)

Note. *Starred variables are only presented to participants who indicated in the registration phase that they apply to them at least some of the time. For the full measurement battery, see Guðmundsdóttir et al., 2025S-a.
[a]No app content is collected (e.g., messages, contact details).

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Table 4

Overview of Potential Network Analysis Approaches for the Central Objectives

Objective	Example Analytical Approaches
Identifying …differences across people in individual transdiagnostic networks of psychopathology	• (Multilevel) Graphical VAR (Bringmann et al., 2013; Epskamp, 2020; Epskamp et al., 2018) • Time-Varying Mixed Graphical VAR (Haslbeck et al., 2021; Haslbeck & Waldorp, 2020) • Individual network invariance test (INIT; Hoekstra et al., 2023)
Linking …individual differences in networks to transdiagnostic traits, variables in the external field and disorder classifications	• Group Comparison for Multilevel VAR (Haslbeck et al., 2023) • Two-step approaches regressing individual network parameters on predictors (Proppert et al., 2025) • Multilevel VAR with continuous moderators of network parameters
Clustering …individuals based into subgroups on their networks and assessing whether these subgroups overlap with common disorder classifications	• Latent Class VAR, Mixture Multilevel VAR (LCVAR; MMVAR; Ernst et al., 2020, 2024; Ernst & Haslbeck, 2025) • Chain Graphical VAR (Park et al., 2024) • Group Iterative Multiple Model Estimation (GIMME; Gates et al., 2017) • Model-based approaches using (non-)linear machine learning models (Ntekouli et al., 2023) • Individual Network Invariance Test (INIT; Hoekstra et al., 2023) to assess network heterogeneity within and across clusters • Regressing cluster membership on predictors

Note. The examples presented here are approaches that can be utilised for the three central objectives – based on the state-of-the-art at the time of writing. We will keep track of the latest developments in the field and always strive to use the most optimal methods. We are also interested in exploring how the data can be leveraged within other modelling frameworks.

generally interested in modelling frameworks that can be leveraged to model data as systems, including but not limited to dynamic structural equation modelling, complex dynamic systems modelling, and machine learning.

Study Potential and Challenges

The current project has some noteworthy potential, both within and beyond the network approach. Its strengths lie in the transdiagnostic focus, the sampling from a clinical population with a broad range of psychopathology, and the adoption of state-of-the-art methodology and complex systems thinking. As far as we are aware, this is one of the largest transdiagnostic EMA studies in a clinical population to date. Of course, a project like this also faces several important challenges.

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In a sea of relevant constructs and measures, selecting the final measurement battery is difficult, particularly when the goal is to map a wide range of psychopathology. Aside from including a representative set of items, we need to consider participant burden, compliance, response biases, and the timescale with which the variables fluctuate. For this project, these challenges were addressed by combining multiple sources of information – both qualitative and quantitative. The initial protocol was based on clinical experts' views collected through focus groups and survey data, and then refined based on insights from a validation study in a student sample (Jover Martínez et al., 2025), differences in population and study goals and a review of the literature. As always, there is room for improvement, but one of the values of this project involves the insights gained (e.g., via participant feedback and psychometric analyses) that can help further refine and adapt this and similar protocols for future transdiagnostic (network) research.

A measurement challenge lies in determining the amount of data needed that balances reliable and well-powered analyses on the one hand and participant burden on the other. There are no clear guidelines on how many observations are needed to estimate individual networks, but early simulation work suggests that small networks (six variables) can be reliably estimated with approximately 100 observations (Mansueto et al., 2023). Based on that, the current studies should provide adequate reliability and statistical power despite missingness. Note, however, that reliability and power are dependent on various other factors, such as network- and item characteristics (e.g., number of nodes, network density, item variability, type of missingness) and whether group- (multilevel) or individual networks are estimated. Thus, any network estimation using these data needs to be made with an eye to such factors. Although more observations are always desirable, a longer EMA phase would not be feasible given the study context (i.e., waitlist for clinical intervention) and analysis aims (i.e., many classic network estimation techniques rely on the assumption of stationarity, which is more likely to be violated for longer timespans; Jordan et al., 2020). Further, a more intense scheduling procedure would likely lead to worse compliance (Eisele et al., 2022; Vachon et al., 2019).

We also foresee challenges on the analysis front. For example, there are concerns (both methodological and conceptual) attached to combining variables at different 'levels' (de Boer et al., 2021; Wichers et al., 2021), whether it be different time scales (e.g., momentary vs daily, state vs trait), data types (e.g., self-report vs passive data, internal vs external factors), or construct breadth (e.g., discrete emotional states vs broad meta-constructs). Current network models for EMA data cannot easily incorporate different data types and variables that fluctuate at different rates (Bringmann, 2024), but this may become possible with methodological advancements (e.g., through 'multi-layered' networks; Riese & Wichers, 2021). Until then, we advocate caution in estimating and interpreting networks with different types of nodes, starting with more homogenous self-report elements measured at the momentary level, which this study is specifically designed for.

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Another analytical challenge is that if the goal is to explore inter-individual differences and subgroups, all networks must contain the same nodes. However, the relevance and fluctuations of nodes likely differ across individuals. To tackle this, we plan to select a generally representative set of nodes for individual comparisons and consider alternative nodes for specific subgroups or when exploring individual networks. This highlights again the need to consider both the nomothetic and idiographic levels of analysis, one of our central objectives.

Conclusion

The *Network Mapping Study* is a research initiative primarily conducted to expand current knowledge on the structure and dynamics of psychopathology and evaluate the utility of the network approach. In addition to the clinical population, its key strengths lie in the transdiagnostic measurement battery and rich information on individuals' psychopathology at both the trait and state levels, providing ample opportunity for collaboration and exploring novel research questions. The amount and richness of the data should lend themselves well to various types of analyses, addressing the nuances of psychopathology from different angles and approaches. When combined with evidence from experimental and intervention studies and work within other (transdiagnostic) frameworks, the insights gained may be integrated into larger knowledge structures that can help move the field forward and achieve the urgent goal of improving measurement, classification and personalised treatment of mental health problems.

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Competing Interests: The authors have declared that no competing interests exist.

Ethics Statement: This research received ethical approval by Maastricht University Ethics Review Committee Psychology and Neuroscience (ERCPN; [nr. 225.97.07.2020]).

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Reporting Guidelines: We follow the JARS-Quant (Reporting Standards for Studies Using No Experimental Manipulation).

Preregistration: The study is preregistered (https://osf.io/93cwz).

Data Availability: The project's OSF repository (https://osf.io/keth3/) contains a comprehensive overview of the study measures, including the full ecological momentary assessment battery in both Dutch and English (see also Supplementary Materials accompanying this publication). Relevant materials, including procedures on personalised reports, analysis code, and publications, will be uploaded to this repository. The consortium is currently developing a data-sharing policy with the goal of fostering open collaboration and data sharing.

Supplementary Materials

The Supplementary Materials contain the following items:

- the preregistration for the study (Guðmundsdóttir et al., 2024S)
- the full ecological momentary assessment battery in both Dutch and English (Guðmundsdóttir et al., 2025S-a)
- the project's OSF repository (Guðmundsdóttir et al., 2025S-b)

Index of Supplementary Materials

Guðmundsdóttir, G. R., Roefs, A., Groot, E., Jover Martínez, A., Jansen, A., & Lemmens, L. H. J. M. (2024S). *Network mapping of psychopathology: Estimation of individual and group networks in a clinical sample* [Preregistration]. OSF Registries. https://osf.io/93cwz

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Research Articles

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A Journey Through Time – Study Protocol for a Randomized Controlled Trial Testing the Add-on Effects of Imagery Rescripting to Ongoing Cognitive Behavioural Therapy in Patients With Depressive Disorders

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Supplementary Materials: Preregistration [see Index of Supplementary Materials]

Abstract

Background: Patients with depression often report recurring memories of stressful events from the past (e.g. experiences of rejection, emotional or physical abuse). These distressing memories, commonly dating back to childhood, can contribute to the development and maintenance of depression through their impact on cognitive schemas. The method of *imagery rescripting (ImRs)* addresses distressing memories and the associated emotions directly: With therapeutic support, patients recall the respective memory and modify the memory during imagination in such a way that the emotional quality and meaning of the memory changes. In this randomized trial, we will assess the impact of a three-session ImRs intervention within standard cognitive behaviour therapy (CBT) for depression, comparing it to an active control intervention (imagery relaxation).

Method: Sixty-six patients with MDD who are currently receiving treatment (CBT) will be randomized to either (1) the experimental condition (ImRs) or (2) the control condition (imagery

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relaxation). Reduction of depressive symptoms, measured by the Beck Depression Inventory (BDI-II) is the primary outcome. The BDI-II will be assessed at baseline, post-intervention, and at 4-week and 8-week follow-ups.

Discussion: This study will help to clarify whether adding three ImRs sessions improves the effectiveness of CBT for depression. We outline the next steps for future research and highlight the potential of this novel intervention for depression.

Keywords

imagery rescripting, major depressive disorder (MDD), distressing memories

Highlights

- Most patients with depression report distressing memories, making them a key treatment target.
- Imagery Rescripting (ImRs) may enhance CBT by reducing negative emotions tied to distressing memories.
- This RCT tests ImRs as an add-on to CBT for depression.

Depression, characterized by low mood and diminished interest in previously rewarding activities, is a pervasive mood disorder and a global health concern (American Psychiatric Association, 2013; Ferrari et al., 2013; James et al., 2018; Whiteford et al., 2013). Despite the effectiveness of established psychological treatments like Cognitive Behavioural Therapy (CBT; Beck, 1970) in alleviating depressive symptoms, approximately 40% of patients do not respond adequately, underscoring the need for innovative interventions (Cuijpers et al., 2021; Zhdanava et al., 2021). The gap between the number of patients in treatment and treatment success points to the importance of further improving the treatment of depression.

A crucial aspect often overlooked in current psychological treatments is the presence of distressing memories, reported by about 80% of depressed patients (Brewin et al., 1996; Newby & Moulds, 2011a; Payne et al., 2019). These memories, even in the absence of traumatic events, predict depressive symptoms and persist to trouble patients who have recovered from depression (Buckman et al., 2018; Kuzminskaite et al., 2022; Nelson et al., 2017; Newby & Moulds, 2011b; Payne et al., 2019). Thus, distressing memories are not only common in depression but could also be a significant treatment target. Distressing memories are associated with unpleasant emotions such as sadness, shame, fear, or anger. While traditional CBT addresses cognitive and behavioural aspects of emotional problems, recent psychotherapy research underscores the importance of bringing the patient's emotions into focus (Greenberg, 2010, 2017; Peluso & Freund, 2018). One technique to address both the distressing memories and the associated negative emotions is Imagery Rescripting (ImRs; Arntz & Weertman, 1999). ImRs, a therapeutic technique integrated into therapeutic approaches or used as a standalone intervention (Kip et

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al., 2023), addresses distressing memories in a two-step process (Arntz & Weertman, 1999). First, the individual vividly imagines the distressing memory, engaging various sensory modalities and experiencing the connected emotions. In the second step, the sequence of events is imaginatively transformed into a more desirable direction. This is achieved through the introduction of a supportive figure – such as the therapist or the patient's adult self – who addresses the individual's emotional needs. ImRs does not alter original memory content but aims to reduce the memory's emotional meaning and emotional impact (Aleksic et al., 2024; Arntz, 2012; Arntz & Weertman, 1999). Arntz (2012) hypothesizes that the central mechanism of change in ImRs is the modification of maladaptive schemas, with emotional changes occurring as a by-product of this process. This perspective emphasizes the cognitive restructuring aspect of ImRs, where the reimagining of events leads to a shift in underlying belief systems, subsequently influencing emotional responses. Experimental research supports the idea that mental imagery has a profound impact on emotion (Holmes et al., 2008, 2009; Ji et al., 2016) and that ImRs reduces negative emotions and distress associated with negative memories (Çili & Stopa, 2021; Nilsson et al., 2012; Reimer & Moscovitch, 2015; Strohm et al., 2021). The positive impact of ImRs on negative emotions as well as on the distressing memories seems promising for the treatment of depression.

Despite its early recognition in CBT (Beck, 1970), the clinical applications of mental imagery within a CBT framework were relatively under-researched until recently, with pilot studies of ImRs as standalone interventions for depression demonstrating significant effects on symptom severity (Brewin et al., 2009; Ma & Lo, 2022; Pile et al., 2021; Renner & Holmes, 2018). Additionally, research has shown that engaging in mental imagery of future positive events can increase behavioural activation in individuals with major depressive disorder, further highlighting the potential of imagery-based interventions in depression treatment (Renner et al., 2017). Meta-analyses by Kip et al. (2023) and by Kroener et al. (2023) have further supported the efficacy of ImRs in treating various mental disorders associated with aversive memories, including depression, revealing large pre-post effect sizes across different disorders and highlighting its potential as a transdiagnostic intervention. Building on this evidence, a recent controlled pilot study by Kanczok et al. (2024) investigated the combined use of cognitive restructuring (CR) and ImRs compared to treatment as usual among inpatients with moderate and severe depression. The study found that patients in the intervention group (receiving CR and ImRs) achieved significantly greater improvements in depressive symptoms over time compared to the treatment-as-usual group. While these findings are promising, further research is needed to investigate the specific additional effect of using ImRs during regular cognitive behavioural therapy, particularly in outpatient settings and with larger sample sizes.

In addition to the open research questions regarding the extent to which ImRs affects depressive symptoms, there is also a lack of evidence regarding the potential

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mechanisms that play a role in ImRs. Studies have shown some evidence for different potential mechanisms on a cognitive level that might be responsible for the effect of ImRs: One aspect that several studies point out is the positive impact of ImRs on different aspects of a person's self-representation (Lee & Kwon, 2013; Wild et al., 2008), self-belief (Cooper, 2011) and self-esteem (Çili et al., 2017). There are study results that indicate that the negative core beliefs associated with the distressing memories reduce in subjects treated with ImRs (Reimer & Moscovitch, 2015). Mancini and Mancini (2018) suggest that the effect of ImRs is based on a reduction of the 'meta-emotional problem', which is linked to a better acceptance of the negative emotions associated with the distressing memories. In the treatment of posttraumatic stress disorder (PTSD) related to traumas experienced in childhood, changes in strengths of encapsulated beliefs and distress of the index trauma preceded changes of PTSD-severity in ImRs (Rameckers et al., 2024), supporting the theory that change in emotional meaning of the memory underlies the effects of ImRs. Assmann et al. (2024) investigated the role of cognitions in the treatment of childhood-related PTSD using ImRs. Their study found that changes in trauma-related cognitions significantly mediated the relationship between ImRs and reductions in PTSD symptoms. These results highlight the critical role of cognitive processes in the effectiveness of ImRs and suggest that targeting maladaptive cognitions may be a key mechanism through which ImRs facilitates therapeutic change in PTSD. Further research is needed on the effects of ImRs on different aspects of cognition and emotion as well as on the 'meta-emotional problem'.

Current research points to the problem that the effect of ImRs on depression has not been tested sufficiently in studies yet, especially not as an adjunct to regular cognitive behavioural therapy. Furthermore, the mechanisms of action of ImRs for depression remain unclear. This randomized controlled trial aims to expand the research on ImRs in depression. The primary objective is to evaluate the effectiveness of ImRs as an add-on to standard CBT for major depressive disorder (MDD). Patients receiving CBT in routine care are randomized to receive either three sessions of ImRs or an active control condition (imagery relaxation). We hypothesize that participants in the ImRs condition will show greater reductions in depressive symptoms from pre-intervention to post-intervention and follow-up. Although ImRs may be applicable across a range of disorders (Kip et al., 2023), we chose to focus specifically on depression in the present study for several reasons: First, the high prevalence of distressing memories among individuals with depression suggests a particularly strong clinical relevance of ImRs in this context (Brewin et al., 1996; Newby & Moulds, 2011a; Payne et al., 2019). Second, existing studies have primarily evaluated ImRs as a standalone intervention; its potential additive effect when embedded within standard CBT for depression remains largely unexplored. Third, depression continues to be among the most prevalent and burdensome mental health conditions, underlining the need for innovative adjunctive treatments. Given these considerations, we see depression as a particularly meaningful

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starting point for examining the clinical utility of ImRs. Importantly, comorbidities are not excluded in our study, reflecting the complex presentations often encountered in routine clinical practice. Secondary objectives of this trial include examining changes in associated psychological variables (e.g., repetitive negative thinking, emotional capabilities, self-compassion, self-esteem). In addition, exploratory analyses will investigate potential mechanisms underlying the effects of ImRs.

Method

Design

The study is a two-arm randomized controlled trial with one active intervention condition (Imagery Rescripting, ImRs) and one active control condition (imagery relaxation). Participants in both conditions are invited to complete questionnaires at baseline session (Session 1), Weeks 1-3 after baseline (intervention Sessions 1-3) and at post and Follow-up 1 and 2 (Week 1, 4 and 8 after the last session). The medical ethics committee of the University of Freiburg has approved the study (Approval number: 22-1518-S2). The study is pre-registered at the German Clinical Trials Register https://drks.de/search/de/trial/DRKS00031495.

Participants

Inclusion criteria are (a) meeting the diagnostic criteria for a current major depressive disorder (MDD), as assessed with a SCID-5-CV interview (patients with comorbid disorders are eligible to participate), (b) age 18 years or older, (c) sufficient proficiency of German language to complete questionnaires. Patients are excluded from participation if they are at high risk of suicidality, defined as the presence of acute suicidal ideation with concrete plans or intent. This is assessed during the standard intake procedure at the outpatient clinic where the study is conducted. Diagnostic information is based on the initial clinical interview (SCID) conducted by the therapist at the outpatient clinic; no additional study-specific diagnostic assessment will be conducted. Participants are informed about the study at the beginning of their treatment but may enrol at any point during their ongoing CBT. The number of standard CBT sessions completed at study entry will be documented and reported. It is important to note that CBT is delivered as part of routine care in the outpatient clinic and is not part of the experimental study protocol. No efforts are made to standardize or influence the content, structure, or dose of the ongoing CBT. However, information on the number of CBT sessions and the use of imagery techniques during therapy will be collected post-hoc via therapist questionnaires.

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Sample Size

Previous research has demonstrated the effectiveness of Imagery Rescripting (ImRs) in treating various mental disorders, with large effect sizes reported when compared to inactive control conditions (Morina et al., 2017). Ma and Lo (2022) conducted a randomized controlled trial comparing ImRs to cognitive restructuring (CR) in depression treatment. Their findings revealed that both ImRs and CR led to significant reductions in depressive symptoms, with medium to large effect sizes observed. In the present study, we aim to build on these findings by comparing ImRs to an active control condition (relaxation) in the context of ongoing Cognitive Behavioural Therapy (CBT) for depression. Since both study arms receive standard CBT and the control condition is active rather than passive, we expect smaller between-group differences than in previous trials. Specifically, we anticipate moderate differences in the reduction of depressive symptoms between the two interventions. To determine the required sample size, we conducted a simulation-based power analysis using the simr package in R. The analysis was based on a linear mixed-effects model that reflects the longitudinal structure of the study, including four repeated measurement points and a random intercept for each participant. Assuming a moderate group × time interaction effect ($\beta = 0.25$) at the final follow-up (FU2), the simulation indicated that a total sample size of approximately 60–70 participants would yield a statistical power of 85–90%. To account for potential dropouts while keeping the study feasible in terms of recruitment and implementation effort, we planned a total sample size of 66 participants with equal allocation to both conditions. This sample size is expected to be sufficient to detect moderate effects over time.

Recruitment

Eligible potential participants will receive written study information from their therapist in the outpatient clinic. If they are interested in participating, they are asked to return a consent form to their therapist, giving permission to be contacted by the research team. A member of the research team will then contact the patient to discuss the study, clarify any questions and see if the patient is interested in participating in the study. If interested, an appointment for the initial session (introductory session) will be scheduled. Informed consent for study participation will be signed at the introductory session.

Therapists

Study therapists will be four graduated psychologists in an advanced stage of clinical training to become fully licensed psychotherapists who are working at the outpatient treatment center of the University of Freiburg. Before the start of the study, study therapists received 15 hours of training in the ImRs procedure by Arnoud Arntz and training

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in the imagery relaxation procedure by Fritz Renner. Clinical supervision meetings are planned on a regular basis throughout the study.

Introduction Session (Baseline)

Prior to the start of the study's therapeutic intervention, participants will complete an online baseline assessment. Subsequently, an initial 60-minute introductory session will be scheduled with each participant. In the introductory session, the participants will get to know their study therapist and distressing memories will be identified using a semi-structured interview based on the work of previous studies (Ma & Lo, 2022; Patel et al., 2007). There will be no restriction on the timeframe where the memory originated as previous work suggests that ImRs can effectively be applied to "older" childhood memories as well as more recent memories. Participants will be asked to recall three distressing memories and will be asked about the content of each memory, their age at the time when the event occurred and the context in which the event occurred. Core beliefs associated with the memory will be assessed by using a standardized protocol. The specific emotions and the current distress caused by the core beliefs will be assessed as well.

Randomization

After the introduction session, patients will be randomized into one of the two conditions using a computer script performing block randomization (1:1, block size = 6). Randomization will be done by a researcher who is not involved in the study sessions. After the randomization, the patients will be sent a video explanation in which their study therapist explains what is going to happen in the respective condition. To ensure consistency and standardization in how each condition is introduced, participants receive a brief video following randomization in which their assigned study therapist explains the rationale, structure, and expectations of the respective intervention. These videos aim to enhance transparency, facilitate engagement, and reduce time needed for explanation during the first session, thereby allowing more time for therapeutic work.

Duration of the Study

The three intervention sessions will take place weekly so the duration of the study therapy sessions will extend over four weeks (see Figure 1). Eight weeks after the last study therapy session, the last follow-up measurement will take place (online). Longer follow-up intervals (e.g., at three or six months) were not implemented in this trial due to feasibility constraints and methodological considerations. Since participants continue to receive non-standardized CBT throughout and beyond the follow-up period, longer intervals would likely introduce greater variability in treatment exposure, making it more difficult to attribute outcomes specifically to the experimental intervention. Shorter

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follow-up intervals were therefore chosen to maintain a clearer link between the experimental intervention and outcome assessments. The duration of the sessions in both experimental and control conditions is comparable (60 – 90 minutes) to control for time and therapist contact. The study procedure is also presented in Figure 1. Participants who take part in all sessions of the study will receive €50 as compensation for their time investments.

Measures

Primary Outcome

Changes in Depressive Symptom severity, assessed by the Beck Depression Inventory-II (BDI-II; Beck et al., 1996) will be the primary outcome. The BDI-II is a 21-item self-report instrument assessing depressive symptoms. The items are rated from 0 to 3, with 3 for the most depressed mood. A score 0 – 13 indicates minimal depression, 14 – 19 mild depression, 20 – 28 moderate depression and 29 – 63 severe depression. The BDI-II will be measured before randomization (baseline), one week after the last session (post-intervention) and 4 weeks and 8 weeks after the last session (follow-up). The BDI-II was chosen as the primary outcome due to its strong psychometric properties, sensitivity to change, and feasibility for repeated online assessments, thereby minimizing participant burden and facilitating efficient data collection.

Secondary Outcomes

We will use the following measures at every measurement (before randomization (baseline), just prior to every session, one week after the last session (post-intervention) and four weeks and eight weeks after the last session (Follow-up 1 and 2)): Depressive symptom severity, measured by the depression module of the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001); Rating (0 – 100) of the belief that the core beliefs captured in the baseline session are true; Rating (0 – 100) of the emotions that are associated with the memories and core beliefs captured in the baseline session; Rating (0 – 100) of the burden of the memories for the patient. The PHQ-9 was included alongside the BDI-II to allow for convergent validation of depressive symptom trajectories. In addition, due to its brevity and ease of administration, the PHQ-9 is used at each study session, making it possible to assess depressive symptoms at more frequent time points than with the BDI-II. This enables a more fine-grained analysis of symptom changes across the intervention period.

The following measures will be administered before randomization (baseline), one week after the last session (post-intervention) and four weeks and eight weeks after the last session (Follow-up 1 and 2): *Repetitive negative thinking*, measured by the Perseverative Thinking Questionnaire (PTQ; Ehring et al., 2011); *Emotional capabilities*, measured by the Self-Assessment of Emotional Capabilities (SEK-27; Berking & Znoj, 2008); *Self-compassion*, measured by the short version of the German Self-Compassion Scale

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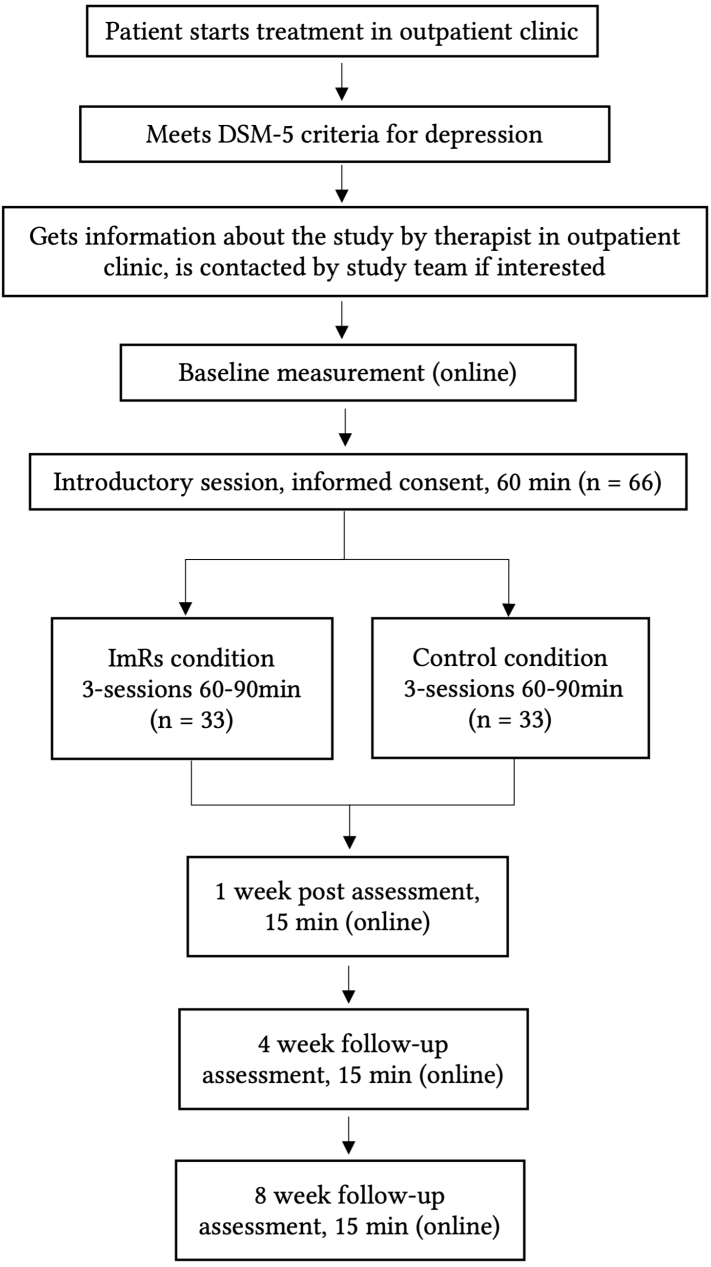
Figure 1

Study Procedure



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(SVS-SV; Hupfeld & Ruffieux, 2011); *Self-efficacy*, measured by the German global self-efficacy expectancy scale (SWE; Jerusalem & Schwarzer, 1999); *Beliefs about emotions*, measured by the German version of the Emotion Beliefs Questionnaire (EBQ; Grüning et al., 2021); *Self-esteem*, measured by the German version of the Rosenberg Self-Esteem Scale (RSES; von Collani & Herzberg, 2003). At post-intervention, we will measure *satisfaction with treatment*, measured by the German patient satisfaction questionnaire (ZUF-8; Schmidt et al., 1989) adapted for the study as well as the *working alliance* between patient and study therapist, measured by the working alliance inventory (WAI; Wilmers et al., 2008). At the post-intervention assessment, the patients will also be asked in an open-response format, to what extent they think they have benefited from the study.

Additional Measures

To evaluate possible confounding variables, the following constructs are measured: *Childhood Trauma*, measured by the Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998), which will be administered during the baseline measurement as ImRs interventions were originally developed for intrusive memories following traumatic events; *Time of intervention*: Time interval (in days) between the participants' regular CBT session and the study therapy session for each of the three intervention sessions; *Comorbid disorders*, as measured with the SCID-5-CV interview at the outpatient clinic before the start of the study;

Therapeutic techniques used in patients' routine therapy, as well as the *amount of regular therapy sessions* received during the study period, will be recorded via a questionnaire sent to the treating therapists at the outpatient clinic after the patient has completed the final follow-up assessment (FU2). The CBT conducted alongside the study intervention is part of routine clinical care and not part of the study protocol. It follows a naturalistic format without a standardized manual, predefined number of sessions, or fixed structure. Consequently, the dose and content of CBT may vary between participants. To monitor potential overlap with imagery-based methods, the therapist questionnaire includes items assessing whether, and to what extent, imagery techniques or imagery rescripting were used during the course of therapy.

Manipulation Check

To check if patients in both conditions engaged in mental imagery, they will be asked to note how vivid the imagery was: After each imagery exercise in the ImRs condition, the patient will be asked to note how vivid the imagery of the respective situation was on a scale from 1 (not vivid at all) to 10 (extremely vivid). To check if the session contained any deviations from protocol, the study therapists will be asked to report any deviations from protocol after each session. To ensure that the conditions are executed as intended, all sessions will be recorded on video and evaluated by two independent raters

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for adherence to the protocol (adherence scales for both interventions were worked out by the study group).

Experimental Condition: ImRs

The ImRs intervention is based on previous experimental ImRs protocols (Arntz & Weertman, 1999; Ma & Lo, 2022). The relaxation intervention in the control group is based on standardized relaxation protocols (Toussaint et al., 2021).

ImRs Session 1 and 2

During ImRs intervention Sessions 1 and 2, participants will be asked to choose one of the three distressing memories. Then they will be asked to delve into the distressing (childhood) memory in their imagination. They will be asked to give a verbal narrative of the contextual and sensory details of the event by questions as for example "what do you see?", "what do you hear?" and "who else is there?", as well as to experience and report the emotions that are activated, to share thoughts that go through their mind, and to express what they emotionally need. When the participants' emotions are sufficiently activated and the most difficult part of the memory is imagined, the therapist will step into the image and change the outcome to a positive ending. The therapist assists the younger self of the participant in addressing the distressing situation, which may include confronting a perpetrator if present. The therapist helps in defending and supporting the younger self of the patient. The therapist will then take care of all other emotional needs of the younger self, helping to process associated emotions and reduce the emotional distress linked to the event. This may involve introducing a sense of safety or control, and when applicable, confronting any responsible parties. Examples of interventions include providing comfort, offering protection, or empowering the younger self. The therapist continues to support the child or younger self of the participant until feeling safe and having all emotional needs satisfied.

ImRs Session 3

During ImRs Intervention Session 3, participants will delve into their remaining (childhood) memory in their image and will be again asked to give a verbal narrative of the contextual and sensory details of the event, as well as to share the emotions, thoughts and needs that are activated. At the most difficult moment the patient is instructed to change perspective and imagine to enter the scene as their present adult self and help their younger self. As modelled in the two sessions by the therapist, the adult self should now intervene in the situation. This may involve addressing a perpetrator and taking care of the needs of the younger self. In the final phase, participants will be asked to once again alter their perspective, this time re-entering the scene as their younger self to experience the support and intervention of their adult self. The younger self is also encouraged to request additional interventions as needed.

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Possible Variations of the Sessions

If the participants want to rescript a distressing memory that was not explored in the introductory session, they will be allowed to use that new situation. In that case, the therapist will briefly assess the new memory using the same structure as in the introductory session (content, age, context, core beliefs, emotional impact), ensuring continuity and consistency of the intervention. If participants do not wish or feel able to personally assist their younger selves in the third session, the session can be conducted as in Sessions 1 and 2.

Control Condition: Mental Imagery Relaxation Condition

The intervention in the control condition will be an imagery-based relaxation exercise based on established protocols (Toussaint et al., 2021). As in the experimental condition, there will be three experimental sessions lasting between 60 – 90 minutes. Guided imagery relaxation is an established technique for stress reduction. Its effectiveness in reducing symptoms of depression, anxiety, and stress has been demonstrated in several studies (Apóstolo & Kolcaba, 2009; Beizaee et al., 2018; Costa & Barnhofer, 2016). The intervention periods in these studies ranged from one week to four weeks, indicating its potential to produce measurable effects within a relatively short time frame. During this intervention positive imagery is used to invoke sensory experiences and physiological responses. Participants will be given the choice between different topics (e.g. a beach, a forest, a lake, a sky full of stars). Then they will be instructed to sit down in a comfortable manner and to imagine themselves in the scene. The therapist will read out a text about the scenery (e.g. how does the sand under their feet feel). The imagery will be combined with breathing exercises. If time permits participants might complete several relaxation imagery exercises during one session with short intermediate breaks.

Data Analyses

To address the longitudinal nature of our data and potential missing values, we will employ a multilevel approach. This method allows us to model individual trajectories of change over time while accounting for between-person differences. The multilevel model will include time as a within-subject factor and condition as a between-subject factor. The interaction effect between time and condition is of main interest, as it will indicate whether the rate of change in depressive symptoms differs between the intervention and control group. All primary analyses will be conducted using an intention-to-treat (ITT) approach, including all randomized participants. Missing data will be handled using mixed-effects models, which are robust to missingness under the assumption of missing at random. Analysis will be conducted in R (R Core Team, 2025). In case of substantial differences between conditions in demographic or any of the potentially confounding variables listed previously (e.g., number of CBT sessions before intervention), the varia-

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ble(s) will be added as covariates to the model. For the analysis of secondary outcomes (e.g., repetitive negative thinking, emotional capabilities, self-compassion, self-esteem), we will employ a similar multilevel modelling approach. Each secondary outcome will be analysed separately, with time and condition as predictors, and the time-by-condition interaction as the primary effect of interest. Given the number of secondary outcomes, we will apply a correction for multiple testing to mitigate the risk of Type I errors across models. Effect sizes will be reported alongside *p*-values to aid interpretation. Results will be treated as exploratory, and full model outputs (including corrected and uncorrected *p*-values) will be provided in the supplementary material to ensure transparency. This will allow us to examine how these outcomes change over the course of the study and whether these changes differ between the ImRs and control conditions.

Exploratory Analyses

We will present the drop-out rate alongside descriptive statistics and include qualitative feedback from participants regarding their experiences with the study. To investigate potential mechanisms of the effects of ImRs, we will conduct mediation analyses within the multilevel framework. Specifically, we will explore whether changes in secondary outcomes mediate the relationship between the intervention condition and changes in depressive symptoms.

Discussion

We presented a study protocol for a randomized controlled trial testing the additional effect of ImRs on depressive symptoms in individuals who are already in treatment (CBT). We hypothesized that, compared to an active control condition, the participants receiving ImRs would have a greater reduction of depressive symptoms.

While there are pilot studies showing significant effects of ImRs on depressive symptom severity (Brewin et al., 2009; Ma & Lo, 2022), this study aims to replicate and extend these promising results. Importantly, no studies have yet examined the additional effect of ImRs during regular CBT for depression. By investigating potential synergistic effects of ImRs and CBT, this study could provide valuable insights into enhancing treatment outcomes for depression. If participants in the ImRs condition show greater improvements in depressive symptoms, it would suggest a promising avenue for augmenting existing therapies. This is particularly significant given that current treatment options for depression are often insufficient for many patients (Cuijpers et al., 2021). Another important aspect that this study attempts to clarify is the underlying mechanisms that may be involved in the effect of the ImRs technique on depressive symptoms. This study contributes to the research on potential mechanisms by assessing the change of different psychological variables during the course of the study and by analysing exploratorily

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whether changes in psychological variables mediate the effect of ImRs on depressive symptoms.

One potential limitation of the study is that the therapists who conduct the experimental interventions of this study are not the same therapists who conduct the ongoing regular CBT. The ImRs and relaxation interventions are therefore not integrated into the ongoing treatment. Moreover, competence and experience levels of the therapists providing the ongoing regular CBT varies. While this approach enhances the ecological validity of our research, it introduces an analytical challenge. Because many therapists are involved in the regular therapy, and each therapist likely sees only few study participants, we can not effectively account for how individual therapists might influence the results. We do not have enough participants grouped with each therapist to reliably measure the impact that specific therapists might have on the outcomes. One other limitation is that the study is powered to find medium to large effects but is underpowered to find small or medium effects between the two active interventions. Furthermore, the effect size assumptions underlying the power calculation may be overestimated, as they are based on studies conducted without concurrent CBT, whereas in the present study, the intervention is delivered in parallel to ongoing psychotherapy. This parallel treatment setting may reduce the observable effect sizes and should be considered when interpreting the results. Finally, this study exclusively relies on self-report measures for primary and secondary outcomes. While this approach allows repeated, low-burden assessment, clinician-rated interviews could provide additional information on how many patients meet diagnostic criteria following the intervention. Additionally, we acknowledge that some participants might no longer fulfil the criteria for a Major Depressive Disorder diagnosis at the time of study inclusion, despite initially meeting them during screening. This should be considered when interpreting the results, as it may influence the generalizability and observed treatment effects.

Overall, we aim to expand the research on innovative interventions for depressive disorders with this study. The results will contribute to a better understanding of the effects of ImRs on depression, as well as its potential added value when delivered alongside ongoing cognitive behavioural therapy. Given that the primary outcome is assessed before the completion of CBT, interpretations regarding additive effects should be considered exploratory.

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Competing Interests: The authors have declared that no competing interests exist.

Ethics Statement: The present study will be performed in line with ethical standards and has been approved by the medical ethics committee of the University of Freiburg (22-1518-S2).

Reporting Guidelines: This study was reported following the CONSORT 2010 Statement (Schulz et al., 2010).

Preregistration: The study is registered at the German Clinical Trials Register (DRKS; registration number: DRKS00031495).

Data Availability: Upon completion of recruitment and data analysis, the data of the presented study will be made available via the Open Science Framework. Alternatively, data will be made available by the authors on reasonable request.

Supplementary Materials

The Supplementary Materials contain the preregistration for the study (see Endres et al., 2023S).

Index of Supplementary Materials

Endres, A., Schaich, A., Arntz, A., Fassbinder, E., & Renner, F. (2023S). *Journey through time – Imagery rescripting of distressing memories* [Preregistration; Registration No.: DRKS00031495]. German Clinical Trials Register. https://drks.de/search/de/trial/DRKS00031495

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