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

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Clinical Psychology in Europe

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Editorial

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A New Chapter: Clinical Psychology in Europe Moves On

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The very first issue of Clinical Psychology in Europe (CPE), published in March 2019, opened with an editorial by the founding editors-in-chief, Winfried Rief and Cornelia Weise (Rief & Weise, 2019). In this editorial, as well as introducing the journal and its aims, they also acknowledged the scepticism that a new journal may face and raised the hope that CPE might become a valuable platform for exchange and dissemination in clinical psychology across Europe. A look through the archive of the past 8 years will make it immediately clear just how successful the journal has been in achieving this aim, both in the quality of the articles, and in the importance and breadth of the topics addressed. Submissions to the journal have continued to grow, with 2025's record of 194 submissions (more than double the number received in 2024) already broken by mid-September in 2026. Indexed in Scopus and recognised with an official impact factor, CPE can now claim to be a well-established, highly competitive, and sought-after outlet for publication.

An additional contributor to the journal's rapid success has been its hosting by PsychOpen GOLD, the open access publishing platform of the Leibniz Institute for Psychology (ZPID); this hosting allowed CPE to operate a Diamond Open Access publishing model, that is, making every article freely available, with no charges to either readers or authors. This in turn was possible via federal and state funding to ZPID. However, the

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funding landscape is always changing, and earlier in 2026 it was announced that due to financial constraints, PsychOpen GOLD would be discontinued, and that the journals it was hosting would need to find new publishing platforms.

Following this announcement we started to explore how it might be feasible to guarantee the continuation of Clinical Psychology in Europe as a viable journal. After careful consideration of several options, we are very pleased to announce that as of 2027, Clinical Psychology in Europe will be published by Hogrefe. Hogrefe has a long history with psychology publishing (Hogrefe, 2024), and will provide a stable and professional platform for CPE to continue to grow and thrive. Perhaps fittingly, this change also comes at what was already a transitional phase for the journal; in 2025 Cornelia Weise and Winfried Rief started to step back from their roles with CPE, and over the course of 2026 the journal has transitioned to a new editorial team comprising Nadine Messerli-Bürgy (who joined as editor-in-chief in January 2025), Claudi Bockting, and Marcella Woud as editors-in-chief, as well as Simon Blackwell as managing editor. Given the increasing number of submissions, changes to the journal's operating model were clearly needed. In this context the move to Hogrefe comes at a particularly opportune moment, offering an opportunity to free ourselves from some of the extensive day-to-day administrative work of keeping the journal operational, and in turn giving us more time and space to reflect on the journal's aims and direction, and to focus on how best to fulfil its mission.

One major change resulting from the transition is that the journal will no longer be Diamond Open Access, as the funds that had originally supported this are no longer available. However, this does not mean that the articles will not be widely accessible: Many authors' institutions have agreements with Hogrefe that will cover open access article processing charges, and we will support authors from other institutions who wish to publish open access without charges to make the most of the possibilities offered by Hogrefe's Green Open Access policies. For example, authors can share submitted and accepted manuscripts at any time via pre-print servers and other repositories.

The present issue of Clinical Psychology in Europe therefore marks the end of a first chapter for the journal, a chapter in which, starting from scratch, it has grown into a huge success story. To have reached this state is a tribute to the work of Cornelia Weise and Winfried Rief in establishing the journal and bringing it to this point. We would therefore like to sincerely thank them for handing over the journal in such great shape, as well as the PsychOpen GOLD team for their support, our teams of editors, assistants, reviewers, everyone who has contributed submissions, and of course you, our readers, whom we hope we can continue to engage and inspire as the journal develops. Stay tuned for the next volume!

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Politics and Education

Distinguishing Between Cost and Value of Psychological Interventions: The Case of Long- Versus Short-Term Therapy

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Abstract

Background: Psychotherapy has been proven in numerous clinical studies to be an evidence-based intervention for many mental disorders. However, the question of the necessary "dose," usually quantified as the number of therapy sessions, is a subject of ongoing debate. While proponents of long-term therapy emphasize significant but small additional effects, skeptics point to highly heterogeneous findings and escalating costs.

Method: Using realistic assumptions about costs, benefits, and resource constraints of psychotherapy, we calculated the long-run public health impact of longer versus shorter therapies. Specifically, we incorporated training costs, limited availability of trained therapists, and short- versus long-term recovery trajectories.

Results: Our simulation shows that, even under optimistic assumptions, short-term therapies achieve more remission-years per unit of cost than long-term therapies. A web application is provided to explore our calculations with customizable parameters and presets based on existing outcome studies.

Conclusion: The discussion of the potential benefits of longer therapies should be expanded to include not only clinical outcomes and therapy dose but also total treatment costs, including training requirements and therapist availability, in cost-effectiveness calculations.

Keywords

psychotherapy, simulation, cost-effectiveness, long-term therapy, short-term therapy

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Highlights

- In debates about the benefits of long-term therapy, resource constraints are rarely discussed.
- In a simulation study, we considered limited therapist availability and other factors.
- We show that, even under optimistic assumptions, short-term therapy is more cost-effective.

The growing need for mental health care is posing significant challenges to healthcare systems worldwide. Psychotherapy is considered an evidence-based treatment for many common mental disorders (Cuijpers et al., 2024), and training programs are designed to equip therapists with comprehensive theoretical and practical expertise. While psychotherapy is well established as an effective treatment, the question of whether its effects increase proportionally with treatment length remains unsettled.

In randomized controlled trials testing treatment manuals for specific disorders, interventions tend to be no longer than 25 sessions. In routine care, however, treatment length varies substantially between countries and funding systems, sometimes exceeding 100 sessions (Flückiger et al., 2020; Lutz et al., 2021). Research comparing shorter and longer treatments shows substantial variation in both treatment duration and outcomes. In some long-term treatment studies, therapies of approximately 50-70 sessions are compared to approaches using more than 200 sessions. For example, one large, pragmatic trial reported remission rates of 67% after 70 sessions of short-term psychodynamic therapy (STPP) and 81% after 240 sessions of psychoanalysis in a ten-year follow-up (Knekt et al., 2008). Table 1 compares the outcomes of long- versus short-term therapy, including a long-term follow-up assessment. These studies are a subset of those included in a meta-analysis by Woll and Schönbrodt (2020) that (a) compared two bona fide psychotherapies that (b) differed in the number of sessions, and (c) included a long-term follow-up.

The relationship between therapy duration and outcome remains a matter of ongoing debate. While existing research consistently demonstrates a non-linear relationship between therapy length and outcomes, showing diminishing returns for each additional session, session count also correlates with initial symptom severity (Lutz et al., 2021). This suggests that patients with more complex symptom presentations are more likely to receive longer therapies and that a mutual agreement between patients and therapists regarding a certain goal determines which dose is considered adequate. The number of sessions also differs between theoretical orientations (Juul et al., 2023). These differences mostly stem from differing theoretical assumptions about change in psychotherapy and are not necessarily based on empirical evidence.

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Table 1

Long-Term Follow-Up Data of Four Studies Comparing Bona Fide Therapies

Author	Long-term condition	Short-term condition	Sample sizes	Follow-up duration	Remission follow-up	Sessions	Therapists	ICER
Huber et al. (2012)	LTPP	CBT	43/41	3 years	83%/42%	234/44	7/7	463
Beutel et al. (2023)	LTPP	CBT	148/104	5 years	59.2%/61%	234/57	73/44	-9833
Lindfors et al. (2015)	LTPP	STPP	128/101	10 years	62%/45%	240/70 (253/93)[a]	41/12	1000
Henkel et al. (2025)	LTPP	STPP	301/127	6 years	90.9%/ 73.7%[b]	229/48	145/89[c] (192/42)	1052

Note. LTPP = long-term psychodynamic psychotherapy; CBT = cognitive-behavioral therapy; STPP = short-term psychodynamic psychotherapy; ICER = incremental cost-effectiveness ratio indicating the number of additional therapy sessions needed to obtain one additional remission.
[a]Session numbers in brackets include "auxiliary sessions". [b]Remission rates were estimated from the reported distributions as they were unavailable in the publication. [c]In this study, some therapists applied both treatment approaches. We decided to classify those as therapists for the STPP condition for the main analysis. The number in brackets indicates the therapist count if those therapists were classified as LTPP therapists.

Session Numbers and Cost-Effectiveness in Published Trials

When comparing treatments with different session numbers, these differences in session numbers may impact cost-effectiveness. To illustrate how the differences in the total session number might affect cost-effectiveness, we computed a rough cost-effectiveness ratio (ICER) by dividing the difference in therapy sessions (the "cost") by the difference in remission rates. The ICER (Incremental cost-effectiveness ratio), as recommended by the National Institute for Health and Care Excellence (2022), is computed as follows:

$$ICER = \frac{\Delta_S}{\Delta_R},$$

where Δ_S is the difference in session numbers, and Δ_R is the difference in remission rates in long-term follow-up. The higher this number, the lower is the additional benefit in terms of remissions.

In a study reporting a large difference in remission rates (Huber et al., 2012), we calculated that an unusually high treatment dose increase of about 463 additional delivered therapy sessions was required to achieve one additional long-term remission:

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$$ICER = \frac{234 - 44}{0.83 - 0.42} = 463.41$$

Assuming average costs between €100 and €200 per session, this translates to €46,300 to €92,600 per additional remission. These estimates are necessarily rough and depend on national health system costs, but they illustrate the magnitude of the investment required. It is important to note that these remission rates refer to a long-term follow-up, meaning that some patients may remain well for a long period after treatment. This raises the question of how to appropriately value such outcomes.

An Illustrative Cost Model

Longer therapies are sometimes assumed to be more efficient because they may yield better long-term outcomes. However, this considers only clinical outcomes and session numbers, while other potentially relevant factors that negatively impact cost-effectiveness, such as training requirements, treatment duration, and therapist capacity, are usually not discussed. To explore these issues, we present two scenarios based on outcome rates observed in previous trials.

Treatment Scenarios and Training Costs

The first scenario is a shorter method that is relatively easy to learn and cost-efficient to deliver. On average, it involves 50 sessions and leads to recovery in 55% of patients. Training for this method costs €35,000 and takes three years. The second method is more intensive and involves 200 sessions, but results in 75% of patients recovering. This difference in remission rates is roughly based on the empirical studies mentioned previously. Training costs €100,000 and takes five years. Each therapy session is assumed to cost €150, with an additional €400 in diagnostic and administrative costs per treatment. A short-term therapist can complete 20 treatments per year, whereas a long-term therapist can complete five. Recovery is defined here as remission sustained for at least five years. The incremental cost per additional recovery exceeded €100,000 even under such favorable assumptions.

We computed the Equivalent Annual Costs (EAC), assuming a 3% discount rate and 30 years worked after qualification (National Institute for Health and Care Excellence, 2022):

$$EAC = K \times \frac{r(1+r)^T}{(1+r)^T - 1},$$

where K is the training cost, r is the annual discount rate, and T is the years worked after qualification.

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Plugging in the assumed costs from the example, we obtain an EAC of €1,786 per year for the short-term therapy and €5,102 per year for the long-term therapy. Dividing these amounts by the number of patients treated per year, we get an EAC of €89.3 per patient for short-term and €1,020 per patient for long-term therapies. Factoring in training expenditures that we converted to an equivalent annual cost leads to a further increase of the ICER by about 4.1%, to €117,154.

Therapist Capacity

Another factor in evaluating cost-effectiveness is therapist capacity. In many health care systems, the availability of trained therapists is a major constraint. To illustrate the impact of treatment length on provider throughput, we assume that a therapist can deliver 10,000 sessions over ten years. Under the short-duration model, this translates to 200 completed treatments, with an expected 110 patients recovering. Given the assumed costs for sessions and training, this results in an expenditure of €7,989 per patient. In contrast, the longer treatment yields 50 completed cases in the same timeframe, with 38 recoveries, for €31,420 per patient.

Remission Years Over Time

Finally, long-term recovery rates reflect only one dimension of therapeutic effectiveness. Some patients may relapse after initially remitting after treatment, while others may continue to improve during follow-up. As such, remission rates at a fixed point in time provide only a limited view of the overall benefit that a therapy may confer across an extended time horizon. To account for changes in outcomes over time, we estimated the total number of remission years achieved by each treatment approach over ten years. We assumed a transition from post-treatment remission probability p_0 to a longer-term recovery level p_T, governed by a decay or growth function k that reflects cumulative improvement or relapse. We assumed that both therapies show 50% remission directly after treatment. We used the following expression:

$$p_T + (p_0 - p_T) \times k,$$

where k is a logarithmic function describing growth or decay over time:

$$k = 1 - \frac{(1+T)ln(1+T) - T}{Tln(1+T)},$$

Accounting for sustained benefits over ten years, short-term therapy produced more remission-years per cost unit than long-term therapy. Based on total costs and remission time, the incremental cost per additional remission year achieved by short-term therapy is modest (€36.79).

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Interactive Web Application

The example discussed above is just an exemplification using realistic, but fixed parameters. We developed a web application illustrating these calculations and allowing users to modify core assumptions such as costs, remission rates, and timeframes. It is available at: https://omegaeta.shinyapps.io/therapy_costs/.

Limitations

Our calculations relied on several assumptions, many of which are set rather conservatively in the sense that they do not disadvantage long-duration treatments. First, trials on long-term therapy are scarce, and their results are heterogeneous, ranging from no to large differences. Our illustration assumed a rather large difference in remission rates in favor of longer therapies, as well as a "sleeper effect" that leads to greater improvement over time. Second, our model does not account for the foregone income associated with the longer training period required for high-dose therapy methods. This omission may underestimate the true cost of delivering treatments with longer, more costly training. Third, the analyses presented do not model treatment effect heterogeneity, i.e., it is likely that some patients benefit substantially more from one approach than another. Instead, our estimates focus on average effects, which may obscure clinically meaningful individual differences in responsiveness. While empirically demonstrated for some disorders, the heterogeneity of treatment effects of psychotherapy is likely not large enough to invalidate our findings (Kaiser et al., 2022). Future, more extensive simulations should incorporate the degree of heterogeneity. Fourth, our model captures only direct treatment and training costs and omits indirect societal costs such as productivity losses from work absence during sessions. In some care systems like Germany's, where patients may take paid time off to attend, these costs scale directly with session number. A full societal-perspective analysis might therefore further disadvantage high-dose treatments, making this another conservative assumption of our model. Finally, the difference between intention-to-treat and completer samples needs to be considered. Willingness to enter and remain in very long treatments is itself selective: patients who cannot commit to 200-300 sessions are less likely to participate or to complete. Remission rates based on completers may therefore partly reflect favorable selection rather than dose alone, overstating the effectiveness of long treatments.

Conclusions and Implications

Valid comparisons between treatment approaches of varying doses require that cost-effectiveness models account for total treatment costs, additional investments due to prolonged training, therapist availability, and recovery trajectories. Even under favora-

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ble assumptions about the long-term efficacy of longer therapies, such approaches are inherently limited under resource constraints. The example presented may highlight the potential necessity of balancing broad availability with therapeutic ambitions. Although practitioners often point out that hardly any patients present with just one clearly definable problem, this would suggest short, focused sequential therapies (see, e.g., Gahnfelt et al., 2025; Voorendonk et al., 2020). However, this does not necessarily imply limiting the maximum dose of psychotherapy. Rather than committing to an a priori therapy dose, measurement-based care could let clinicians detect when a patient has reached a "good-enough" level and reallocate capacity. For training, an important implication would also not necessarily be that "shorter therapies are better", but that curricula should build competencies in brief, focused, and modular approaches that can be sequenced flexibly for comorbid presentations.

Ultimately, improving access to effective mental healthcare for more patients may depend less on maximizing individual treatment duration than optimizing the allocation of limited therapist capacities (Delgadillo et al., 2017, 2022). Although our data were based on studies involving adult patients, it is worth noting here that similar considerations are also necessary for children and adolescents. It is precisely in this area that broader availability is likely to have an even greater impact, because psychotherapy can be viewed as both a preventive measure and a treatment during critical developmental phases (Hudson et al., 2023).

To conclude, our calculations provide several arguments for psychotherapy training developers and policy makers to consider cost-effectiveness calculations at both the patient and therapist levels when further developing and formalizing psychotherapy training programs.

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Reporting Guidelines: This article reports an illustrative simulation-based cost model. It does not report a clinical trial, a systematic review, or newly collected empirical data, so no EQUATOR reporting guideline applies directly to this study type. Where applicable, the reporting of model structure, parameter sources, and assumptions follows the Consolidated Health Economic Evaluation Reporting Standards (CHEERS 2022; Husereau et al., 2022), and the presentation of quantitative results follows the APA Journal Article Reporting Standards for quantitative research (JARS–Quant).

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Data Availability: No new empirical data were generated for this study. All parameters entering the calculations are reported in the manuscript, and the calculations can be reproduced and varied using the web application at https://omegaeta.shinyapps.io/therapy_costs/.

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Reasons for Discontinuing Internet-Delivered Cognitive Behavioral Therapy-Based Treatment for Older Adults With Depression: Findings From a Qualitative Study

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Supplementary Materials: Materials [see Index of Supplementary Materials]

Abstract

Background: Online psychological interventions, particularly internet-based cognitive-behavioural therapy (CBT), have proven effective in treating mental health issues such as depression and anxiety. However, participants often drop out before completing these interventions, especially in the context of ICBT for older adults. Understanding the reasons for dropout can improve engagement and the overall effectiveness of online interventions.

Method: Thematic analysis was employed to examine reasons for dropout from an online CBT intervention for older adults (60+). Semi-structured interviews were conducted with 9 participants who dropped out of the program. Data was analysed using thematic analysis.

Results: Key themes underlying dropout included technical difficulties, perceived ineffectiveness, the program's rigid format, and symptom exacerbation. Participants also highlighted a lack of personalized support and dissatisfaction with the program's content. Broader engagement barriers emerged as well, such as limited digital literacy, frustration with the structure, and a mismatch between participants' expectations and the program's offerings.

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Conclusion: While online CBT can be an effective tool for older adults, factors like program rigidity, lack of personalization, and digital literacy challenges must be addressed to reduce dropout rates. Tailoring content and improving participant support are essential for enhancing engagement and ensuring the success of internet-based interventions for older adults.

Keywords

online intervention, CBT, older adults, dropout, thematic analysis, engagement, digital literacy

Highlights

- Internet CBT can help older adults with depression, yet they are underrepresented in research.
- Older adults who left internet CBT named environmental, personal, program and belief barriers.
- Barriers rarely acted alone. They reinforced each other, making dropout more likely.
- Flexibility, clear expectations and live contact may help retain older adults.

Delivering interventions via the internet is now an established format. Extensively utilized and analysed in research, internet interventions have been the subject of study for more than twenty years (Andersson et al., 2019; Andersson, 2024). While internet interventions vary, most programs and studies employ forms of cognitive-behavioural therapy (CBT), typically delivered via platforms that host the intervention and track progress. Materials are often provided in written, video, or audio formats, alongside "homework" assignments. Participants may interact with an assigned psychologist or, in self-help programs, access automated support resources (Andersson et al., 2019). Internet-based cognitive behavioural therapy (ICBT) has demonstrated efficacy in reducing symptoms across a broad spectrum of psychiatric, somatic, and mental health conditions, with success in diverse subpopulations such as older adults and students (Käll et al., 2024). A recent meta-analysis suggests that ICBT and face-to-face CBT do not significantly differ in dropout or attrition rates (Linardon et al., 2026). Consistent with this, prior studies suggest that ICBT is a viable alternative to face-to-face treatment for individuals with depression, anxiety, functional disorders, and eating disorders (Andersson et al., 2016; Hedman et al., 2012). Although some evidence suggests that therapist-guided ICBT yields superior outcomes (Karyotaki et al., 2021; Titov et al., 2016), unguided ICBT nevertheless shows substantial potential for achieving meaningful long-term benefits, particularly in settings with limited economic and workforce resources.

A crucial aspect of online/internet interventions that has been widely studied is participants' engagement. One of the most frequently analysed factors is what predicts or influences engagement. Beatty and Binnion's (2016) systematic review found that female gender, individuals with higher expectations for effectiveness, and those receiving psychologist support were factors resulting in more engagement. Other studies have

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examined engagement specifically in online interventions targeting mental health conditions. Wallert et al. (2018) in a study of an internet-based intervention for symptoms of depression and anxiety following myocardial infarction, reported higher engagement among women, particularly among participants whose fear of cardiac symptoms motivated program use. Research focusing on internet-based treatments for depression among adults has similarly highlighted the importance of therapist support. Doherty et al. (2012) emphasized psychologist support, noting that 36% of participants dropped out with it, compared to 74% in similar interventions without psychologist involvement. From participants' perspectives, Donkin and Glozier (2012) found that factors such as perceived benefits outweighing effort, a sense of obligation to the researchers, and the belief that participation could help others encouraged continued engagement. Thus, factors like gender, expectations, intervention format, perceived benefit, and commitment to the study all influence engagement, though their impact may vary across different interventions and populations.

The number of studies on the reasons for discontinuing participation in online interventions has been steadily rising. In nine studies included in a systematic review on internet interventions for anxiety and depression, participants were asked to specify their reasons for dropping out (Christensen et al., 2009). The identified reasons included lack of time, motivation, technical difficulties, depressive episodes or physical health issues, absence of live contact, preference for medication over the intervention, perceived lack of effectiveness, improvement in symptoms, and the program's workload. Later studies on dropout from online interventions for relaxation, anxiety treatment, and psychoeducation on bipolar disorder support these factors (Alfonsson et al., 2016; Johansson et al., 2015). These findings have been corroborated by more recent research. Nomeikaite et al. (2023) reported similar program-related and person-related reasons for discontinuation of therapist-supported ICBT among healthcare workers for stress recovery. Building on these earlier findings, Simon et al. (2025) identified both consistent factors and new barriers specific to ICBT for insomnia, including distractions from daily life, difficulties resuming after treatment breaks, the impersonal nature of the intervention, and insufficient e-coaching support. Meanwhile, meta-analysis findings on dropout in self-guided internet interventions for depression show that demographic factors like being male, having lower education, or being younger increase dropout risk (Karyotaki et al., 2015). More recent quantitative studies suggest that technical difficulties and personality traits like openness predict higher dropout rates in ICBT with support (Schmidt et al., 2019) and how quickly people complete the first module was one of the strongest early warning signs of dropout (Moshe et al., 2022). Similarly, Lawler et al. (2021) qualitative study showed that actual treatment experience and engagement matter more than demographic or technology factors, indicating that life stress and competing demands are the main reasons people drop out. Therapist-guided ICBT treatments have been associated with lower drop-out rates compared to the unguided format. The reasons for dropout are

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diverse. However, the most common factors across studies were lack of time, technical difficulties, perceived ineffectiveness, and lack of personal support.

Although there are a few studies specifically on ICBT for older adults, existing research indicates that it effectively reduces depressive symptoms, psychological distress, and improves daily functioning (Hobbs et al., 2018). ICBT is an attractive treatment option for older adults (Stanford & Just, 2025), and older individuals show better adherence compared with younger people (Karyotaki et al., 2015). However, significant barriers remain. Gould et al. (2024) found that older veterans experienced difficulties with self-directed home practice, including difficulty setting time aside, forgetfulness and competing demands. Similarly, treatment dropout in therapist-supported ICBT for depressed older adults was associated with older age and lower computer skills (Eimontas et al., 2025). Multiple factors contribute to these challenges: limited digital literacy and age-related cognitive changes, lack of reliable internet or technology access, stigma surrounding mental health treatment, discomfort with digital tools, and preference for face-to-face interactions (Andrews et al., 2019; Sander et al., 2016; Seifert et al., 2019). These barriers correlate negatively with both age and illness severity (Stanford & Just, 2025). Despite these findings, older adults tend to view internet interventions positively yet remain underrepresented in internet-intervention research (Stanford & Just, 2025). Understanding older adults' experiences and engagement with ICBT is therefore essential, particularly given that it remains an effective method for addressing depression in this population (Xiang et al., 2020). However, few studies have investigated the experiences of older adults who discontinue treatment. This is important because dropouts are hard to reach, since they already made the decision to stop participating and have less motivation to dedicate their time to the study. However, previous studies found that adding therapist support to the intervention improves completion of post-treatment assessments. An individual patient data meta-analysis found that older participants are less likely to drop out from ICBT for depression (Karyotaki et al., 2015). However, there are only a handful of studies of ICBT for depressed older adults and none of them identified the reasons for dropout. Thus, investigating the reasons in internet-based intervention programs is essential for identifying and mitigating barriers to participation, thereby optimizing the effectiveness, accessibility, and sustainability of online therapeutic approaches for older adults.

Method

Thematic analysis was employed in this study following the guidelines provided by Braun and Clarke (2006). This method was used to explore participants lived experiences and identify patterns in their responses without imposing predetermined theoretical frameworks. There are six phases of thematic analysis: 1) familiarising yourself with the data, 2) generating initial codes, 3) searching for themes, 4) reviewing themes, 5) defining

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and naming themes, and 6) producing the report. This approach groups and illustrates in detail the available data and allows interpretation of various aspects of the subject of the study. This allowed us to derive themes from the data itself, providing insight into how older adults actually experience internet-based interventions.

Participants and Intervention

All participants in this study were part of the larger study on the efficacy of an internet-delivered treatment for depressed 60+ year adults (Eimontas et al., 2021). Participants were self-referred and were recruited through traditional and social media, public health centres and non-governmental organisations. After completing the registration form and providing informed consent, participants filled in self-report questionnaires and those 84 who met inclusion criteria and did not meet exclusion criteria were randomly assigned to either 8 weeks of internet-delivered CBT or a waiting-list. The intervention was guided with scheduled messages from the program therapist and responses to enquiries on demand. The intervention consisted of modules of psychoeducation on depression and CBT, behavioral activation and other CBT typical modules all of whom had an exercise to be completed by the participants. More information on the intervention can be found in the study protocol paper of this RCT (Eimontas et al., 2021). The participants who dropped out during the course of the program were selected for this study. Dropouts were defined as those participants who were assigned to the treatment group and did not complete four or more of the final intervention modules out of eight or who formally informed that they would no longer participate in the program. In total, there were 13 such participants (12 women, one man). All participants were contacted by telephone to arrange an interview time. Two participants declined to participate in the interview and the other two could not be contacted. One woman who declined to participate stated that she had nothing to say because she had not participated due to problems with trying to join the program. Another woman stated that she declined to participate because the content of the program did not meet her expectations. The final sample for this study consisted of nine dropouts (eight women, one man). Agreeing participants were asked to find a private space for the time of the interview. The mean age of these participants was 71.44 years (SD = 4.72), and the mean duration of poor mental health was 17.89 months (SD = 18.42). Eight out of nine participants had completed tertiary education, seven out of nine lived in a metropolitan area, and two out of nine had a previous diagnosis of depression. Only participants who fulfilled diagnostic criteria for depression according to the Mini International Neuropsychiatric Interview (MINI; Version 5.0.0) during a telephone interview were deemed eligible for participation in the study. At baseline, the average score on the PHQ-9 was 12.01, and dropouts did not differ from completers on their baseline scores (Eimontas et al., 2025).

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Instruments and Study Design

The study used a semi-structured interview (Annex 1), which consisted of 13 questions, of which two were basic questions: "*Could you name the reasons why you stopped using the program?*" and "*What do you think should be different in order for you to fully participate in the program?*". The other questions aimed to find out how the participants found out about the program and decided to take part, what were their habits of using the program (what device did they use, where did they use it, what time of the day/week did they use it, what did they do when they were logged in), what was useful, what was harmful, what was missing, what would the participants suggest adding to the program, and whether they would use a similar web-based intervention in the future. The questions were pilot tested with graduate-level clinical psychology students involved as therapists in the intervention.

The interview was conducted remotely, with the call being made via Skype and recorded in OBS Studio. A total of nine interviews were carried out by the interviewer TG after treatment commenced in April of 2021. The interviews were conducted between one and three weeks after the intervention ended. The total duration of the interviews was 2 hours, 46 minutes and 14 seconds. TG (male), who was an undergraduate student in Psychology at the time of the interviews, had contacted the participants in advance to arrange the time for the interviews. TG was formally trained at the University to conduct semi-structured interviews. TG did not know the participants prior to the study. At the beginning of all interviews, the participants were informed about the purpose of the study: to better understand the reasons why they dropped out of the program. They were also informed that the interview would be recorded and their consent was obtained. The resulting recordings were transcribed using ATLAS.ti and the resulting texts were transferred into Microsoft Word documents. The resulting transcripts totalled approximately 27 pages or 73 268 characters. Additionally, the interviewer made field notes during and immediately after the interviews to record participant engagement, interview flow and any interruptions.

Data Analysis

An inductive thematic analysis approach was used to identify patterns directly from the interview data rather than fitting data into predetermined categories. The transcribed data was read several times, noting any ideas that emerged during the reading that might be useful during the coding process, in order to gain a better understanding of the material and to facilitate further work. This was followed by the generation of the initial codes. The resulting codes and their assigned quotes were read several times in order to merge overlapping codes. This was followed by a common theme search, which attempted to combine the codes into themes. This was done by writing out the codes on slips of paper and trying to group them under similar themes. The data was

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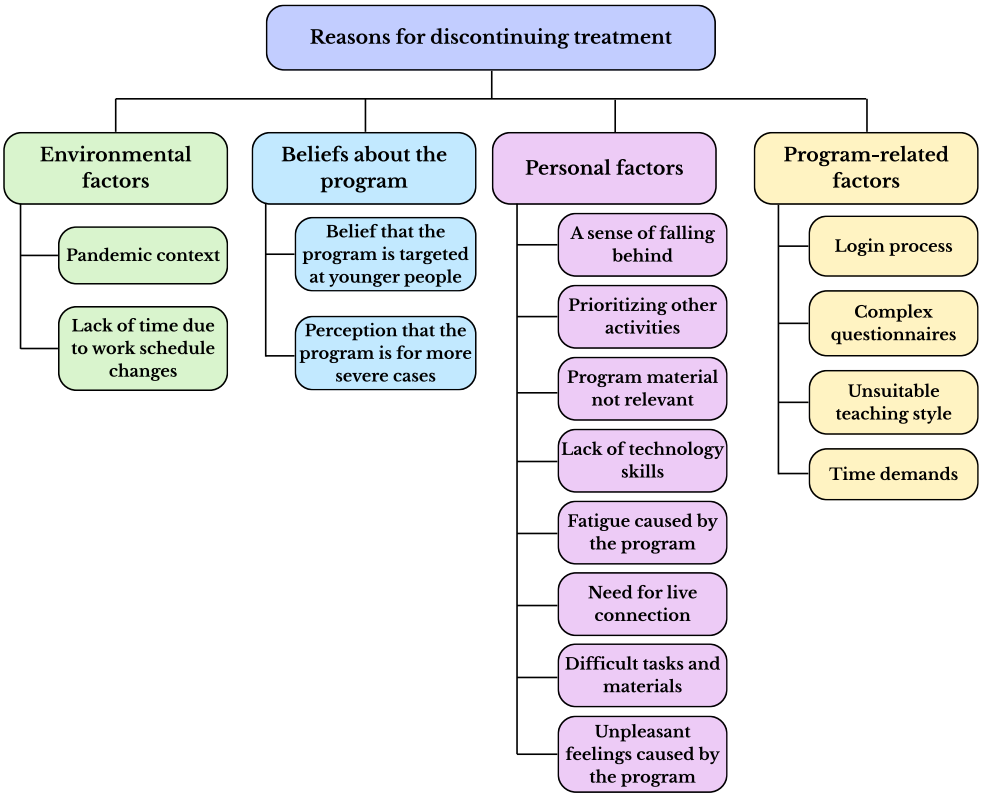
rated by two coders. TG, who conducted the interviews and was familiar with the data, performed the initial coding. ELV reviewed the coded interviews to check for consistency between coders. Disagreements were discussed and resolved collaboratively with JE. The research question guided which codes and themes to prioritize. This process identified four groups of codes, and each of these groups was subdivided into sub-themes. Finally, a map of themes and sub-themes was drawn up, where names were assigned to the main themes and sub-themes.

Results

A total of four themes on reasons for treatment discontinuation emerged from the interviews (Figure 1). We further present the themes and subthemes with quotes from the interviews and discuss these findings.

Figure 1

Themes and Subthemes for Reasons for Discontinuing Internet-Delivered Psychological Treatment for Depression



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Theme 1: Environmental Factors

Two participants described environmental barriers that contributed to disengagement from the intervention, relating to changes in work conditions and the broader pandemic context.

1.1 Lack of Time Due to Work Schedule Changes

Only one participant reported work-related barriers to engagement. Participant 6 (P6) enrolled in the program while on sick leave, anticipating greater availability once she returned to work. However, unanticipated changes to her schedule resulted in extended evening shifts, substantially reducing both her available time and energy for program activities. These changes made it difficult for her to maintain engagement with the intervention:

> "*Well, I thought I would get back from work and then (I work there until 4 o'clock) I would get back, and then I would be more free and I would be able to do the work [reading and exercises for the program] there, but I had to work the shifts there until 8 o'clock, 9 o'clock, and then when I get back [home] I don't feel like it anymore, and I don't have the time in the morning either, you see how it is... And there are a lot of questions.*" (P6).

1.2 Pandemic Context

Pandemic-related circumstances created multiple, compounding barriers for participant 8 (P8). She described experiencing physical discomfort following COVID-19 vaccinations, which negatively affected her well-being and motivation to continue with the program:

> "*I thought that this program must be a good fit for me, but when I was, well, in a situation of me and the computer [no face-to-face contact] - I just gave up. But, you know, there's also this... Because after one vaccination it wasn't great... it wasn't too bad, I didn't need a doctor or something, but I felt bad for a few days, and after the second vaccination it was even worse... This whole... the problems with the tablet... Well, it all came together so that I capitulated and that was it.*" (P8).

In parallel, technical difficulties with her tablet further hindered participation. Limited digital skills, combined with reluctance to seek in-person assistance due to incomplete vaccination, made resolving these issues challenging:

> "*You know, it was a sum score of many things, I think, that are, well, my negligence, but also a lot of things that are bad. One thing was the vaccinations and everything else. Another thing was that I don't have a*

> *normal computer, I have a tablet. It started running out of space and, and messages were popping up that I need to clear some space, you write two sentences in there and, and again you need to do something, and I need to clear it, I don't know how to do anything myself, I'm taking it to Akropolis [a local shopping mall], I didn't have both my vaccinations, I didn't want to go anywhere with my tablet ...*" (P8).

Theme 2: Personal Factors

Several personal factors contributed to participants' disengagement from the intervention, including perceived irrelevance of program content, competing priorities, negative emotional responses, fatigue, limited technological skills, and unmet expectations regarding face-to-face interaction.

2.1 Program Material Not Relevant

Four participants reported that the program content did not resonate with their personal needs, experiences, or expectations. When the material was perceived as disconnected from their own reality, motivation to engage diminished. As participant 3 (P3) noted:

> *"Yeah, it seemed to me that the questions that were there made them seem kind of irrelevant... And, I don't know, somehow, it was irrelevant to me."* (P3)

2.2 Prioritising Other Activities

Competing priorities also influenced engagement. Some participants preferred to focus on seasonal or recreational activities, such as gardening, which they experienced as more meaningful or enjoyable:

> *"It's summer, I like to go to the garden, work there, do something, but to solve something or... umm... well, kind of learn something or whatever, well... I don't want to, I'm not ready for it now. I just want to focus on other things."* (P6).

Others described becoming distracted by alternative programs or activities that aligned more closely with their interests. Participant 2 (P2) explained, *"Oh, but then there were so many different programs that interested me more, so I didn't really pay much attention."*

2.3 Unpleasant Feelings Caused by the Program

For some participants, engagement with the program evoked negative emotional responses, including frustration and annoyance, which contributed to discontinuation. Participant 1 (P1) described withdrawing after becoming emotionally disengaged:

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> *"I didn't get any benefit from it, because I, I say, stopped participating because I was annoyed and I didn't want to do it anymore. Then there is no benefit."* (P1).

These reactions were often associated with a perceived mismatch between participants' expectations and their experiences of the program.

2.4 Fatigue Caused by the Program

Several participants described the program as mentally demanding or overwhelming. The volume of tasks and repetitive nature of the questions contributed to feelings of exhaustion, making sustained engagement difficult:

> *"Well, maybe there were too many questions right from the start. Somehow, they just kept coming – one, then another, then a third, and then it just kept going and going... somehow, it's just exhausting."* (P6).

2.5 Lack of Technology Skills

Technological challenges were commonly reported, particularly difficulties with logging in and managing devices. Four participants experienced problems accessing the platform. Participant 4 (P4) described repeated unsuccessful login attempts:

> "*The details were there, the numbers were there and the password was there. I did everything, entered everything and I couldn't log in. ... Well, I don't know why it didn't work, you can decide for yourself, but I didn't log in. I logged in once and that was it."* (P4).

Device-related difficulties were also highlighted, especially by participant 8 (P8), who experienced persistent problems with her tablet and emphasised the need for greater technological support:

> *"... a young person couldn't even understand what I'm saying here now. They would say it's nonsense - you press one button and it's all clear. What if I don't know which button to press? So where is the age in all of this? It's not the age itself, but the interaction between age and modern ways of communicating..."* (P8).

2.6 Need for Live Connection

Five participants expressed disappointment regarding the lack of in-person interaction. They reported expecting practical guidance, examples, or structured sessions delivered face-to-face. P8 described missing live contact with program staff:

> "*Well, I missed some live communication. Although there were supposedly telephones - if you want to call, call. But you know, it is one thing*

> *to make a call, but it's another thing if the program itself had, for example, at least every three, let's say, every three topics you've gone through - there is some kind of live communication. Or something else. So that's what I was missing, a live connection with the lecturers or, or the managers, whatever you call them."* (P8).

Similarly, participant 5 (P5) highlighted the importance of human interaction, describing how the absence of direct personal contact influenced their engagement with the program:

> *"Purely remote, just me and the computer—well, I don't like that kind of communication. I need a live person I can interact with."* (P5).

2.7 A Sense of Falling Behind

For some participants, the inability to keep pace with the program created feelings of frustration and inadequacy:

> *"At first, I thought I might catch up, but when I realized I couldn't, I stopped altogether."* (P1).

Others described disengaging after missing several sessions, perceiving continuation as no longer worthwhile:

> *"Oh, and then I thought, well, I've already missed so much, what's the point of filling it in now, and that's how I ended up abandoning it."* (P8).

2.8 Difficult Tasks and Materials

Finally, participants expressed frustration with tasks and materials they found overly challenging. For some, the effort required to focus and complete these tasks was overwhelming, leading to disengagement:

> *"Well, it's just, I, well... I had a hard time answering those questions. And, and, and, and... I couldn't concentrate, I had to think of something... Well, yeah... I didn't feel free."* (P6).

These findings illustrate how multiple aspects of program design collectively influenced participants' capacity to engage with the intervention. Together, these personal factors reduced participants' motivation, emotional readiness, and perceived ability to engage with the intervention.

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Theme 3: Program Related Factors

Another identified theme was program-related factors, encompassing barriers arising from the program itself. These challenges included overly challenging tasks or materials, unsuitable teaching styles, complex logins or questionnaires, and excessive time demands. Each of these issues created obstacles for participants, impacting their ability or willingness to fully engage with the program.

3.1 Time Demands

A prominent barrier for many participants was the perception that the program was too time-consuming. The number of questions and the time required to answer them led to frustration and, in some cases, withdrawal. For some, the constant awareness of the pending task added to their stress:

> *"I didn't want to participate because... I... a lot of questions, it takes a long time to answer and then I think all day that I have to answer today..."* (P4).

3.2 Complex Questionnaires

Closely linked to time demands was the complexity of the questionnaires. Participants reported that the phrasing of the questions, particularly those requiring reflection on emotions over an extended period, felt ambiguous and unhelpful. This uncertainty reduced confidence in their responses and further diminished engagement:

> *"Especially when there are all the questions to be answered, and so for two weeks, what happened, so: did you feel happy? Well, in those two weeks you feel different things - happy and unhappy. Well, the answer is - I can write happy, it will not be specific. I can say unhappy - it will also be unspecific. I don't know, I don't know, it's like that, you know, somehow..."* (P1).

3.3 Login Process

Technical aspects of the program also presented barriers. Some participants found the login process unnecessarily complicated, which they attributed to the need for security protocols. However, this additional complexity discouraged participation, particularly for individuals unfamiliar with such systems:

> *"Well, maybe logging in should be easier. Well, but here you're just protecting all that information, so of course it needs that protection, well. Because there's those personal codes, everything, well."* (P8).

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3.4 Unsuitable Teaching Style

For two participants, the teaching style of the program felt restrictive and reminiscent of a traditional classroom setting. This approach left participants feeling unengaged, as they preferred practical advice or relatable examples rather than tasks that felt like homework:

> *"I felt like a student and that I had to do something there, do something, and so on... Umm... I like it more... Well, maybe listening to, like, some advice, stories from... Examples of things that, well, help people if something goes wrong. And anyway, well, I say, I feel like... Well, like a schoolgirl who had to do her homework."* (P2).

Theme 4: Beliefs About the Program

Participants' beliefs significantly shaped their engagement. Key barriers included perceptions that the program was for younger individuals, challenges in catching up on missed material, doubts about its relevance to their mental health, and dissatisfaction with the lack of face-to-face interaction.

4.1 Belief That the Program Is Targeted at Younger People

Some participants perceived the program as designed for younger individuals, attributing this belief to their own perceived lack of technical skills and discomfort with digital tools:

> *"This is not for me anymore. It's for younger people, maybe those who think faster."* (P3).

P8 similarly attributed her disengagement to limited digital skills and physical strain, describing a sense of not belonging in a technologically oriented environment:

> *"I use Google and email, but that's it. Sometimes I can't even manage Messenger... It's about a lack of technical knowledge. My eyes get tired, and this style seems tailored for younger people, not me. I blame myself for entering a space where I don't belong anymore."* (P8).

4.2 Perception That the Program Is for More Severe Cases

Several participants questioned the relevance of the program to their own circumstances, perceiving their mental health concerns as insufficiently severe to justify participation: *"I read the questions and thought, everything's fine with me. I don't have depression."* (P1).

Similarly, participant 7 (P7) expressed feeling well enough not to require psychological support: *"I realized my situation wasn't bad enough to need psychological help. I feel well enough not to need special assistance."* (P7)

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Overall, these beliefs shaped participants' sense of whether the program was appropriate for them, influencing how they understood its relevance and purpose.

Discussion

This study explored why older adults dropped out of an internet-based cognitive behavioural intervention for depression. Four types of themes were identified: environmental, personal, program-related, and belief-based. Importantly, these barriers rarely acted alone but they tended to build on each other, making dropout more likely when several factors combined.

Most of the findings in this study align with previous research on dropout risks in internet programs for depression (Christensen et al., 2009; Beatty & Binnion, 2016; Lawler et al., 2021; Moshe et al., 2022; Schmidt et al., 2019), including lack of time, external life stressors, technical difficulties, the need for live connection, dissatisfaction with program content, and the burden of participation. However, for older adults with depression, these barriers may have a greater impact due to unique age-related factors, such as reduced technology skills and cognitive and emotional limitations associated with depression (Stanford & Just, 2025).

While technical difficulties in ICBT have been associated with negative effects in general populations (Fenski et al., 2021; Rozental et al., 2015), older adults may experience these barriers with particular intensity due to the limited digital literacy, age-related cognitive and emotional challenges, and depression itself (Stanford & Just, 2025), which can turn minor technical issues into significant sources of frustration and disengagement (Vaportzis et al., 2017). Program design features amplified these technical challenges. Confusing questionnaire phrasing, overly difficult tasks, high volume of questions and a formal presentation style can feel burdensome (Johansson et al., 2015) and lead to frustration or even fatigue. Critically, it is important to recognize that these program-related barriers operated alongside depression symptoms themselves. Participants who met depression screening criteria at baseline experienced symptoms, such as low energy, hopelessness, and negative thoughts, which directly affected their motivation and ability to engage. This underscores the need for clear initial technical guidance and ongoing support to reduce these compounding effects (Schmidt et al., 2019).

The program's rigid weekly structure created another problem - participants who missed sessions struggled to catch up and often gave up. Research has shown that engagement depends on maintaining momentum with scheduled tasks and participants who take longer to complete early modules are at higher risk of dropout (Moshe et al., 2022). When participants fall behind, the accumulation of missed modules can become overwhelming and lead to discontinuation (Christensen et al., 2009). While flexibility in pacing might seem beneficial, evidence suggests that intervention breaks themselves are associated with increased dropout risk (Simon et al., 2025). Instead, alternative design

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features such as catch-up modules, automated progress tracking or proactive therapist check-ins could help participants navigate missed sessions without abandoning the intervention entirely.

Beyond these technical and structural barriers, the program's cognitive and emotional demands also contributed to disengagement. Program design features combined with depression symptoms may lead to fatigue and negative emotions that discouraged continued engagement. These barriers are as well found in studies of drop out (Beatty & Binnion, 2016; Nomeikaite et al., 2023). While negative emotional reactions are normal and distinct from lasting symptom worsening, they may still discourage continued engagement (Nomeikaite et al., 2023). These emotional reactions align with known negative effects in ICBT (Rozental et al., 2015) and participants with depression symptoms facing these challenges are more likely to discontinue treatment (Fenski et al., 2021). Even though normalising such emotions and providing guidance on dealing with them is a common strategy when a participant expresses them, some participants do not share them during treatment. Therefore, proactively emphasizing that these reactions are common and normal, might contribute to better engagement.

Program-participant mismatch emerged as another significant barrier, a common barrier to sustained engagement in ICBT (Alfonsson et al., 2016; Beatty & Binnion, 2016; Nomeikaite et al., 2023). This took multiple forms. Some participants perceived the program content as irrelevant to their lives, as well as prioritized other activities instead, which is documented in older adults (Gould et al., 2024). Additionally, several felt it was better suited for younger, more digitally confident individuals. Others felt their difficulties were not serious enough to justify taking part. These beliefs shaped how participants understood the program's purpose and whether they felt it was relevant to them. When participants do not see the program as fitting their circumstances or other commitments, they may try less to make time for it. Making the program more personal could help. While the intervention had some tailoring, it was limited to therapist selection from existing modules. In face-to-face psychotherapy research, it has been found that taking participants' therapy preferences into account is associated with better therapeutic outcomes and a lower risk of participant dropout (Swift et al., 2018). As well as clearer communication about the program's intended audience, and the types of difficulties it addresses, could help reduce early dropout (Johansson et al., 2015; Nicholas et al., 2010).

A strong and recurring finding was the need for human contact and live interaction, a common theme in ICBT dropout studies (Alfonsson et al., 2016; Johansson et al., 2015; Nomeikaite et al., 2023). While Linardon and others (2026) found that ICBT and face-to-face CBT do not significantly differ in dropout rates, our findings suggest that older adults may distinguish between delayed written support, like scheduled messages and responses to enquiries and real-time live interactions such as video calls or chat. Furthermore, some evidence shows that therapist-guided ICBT works better than ungui-

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ded versions (Titov et al., 2016). Our findings suggest that for older adults, how the support is provided matters. Especially for older adults face-to-face communication may be particularly important for familiarity and reassurance. Moreover, in internet-delivered interventions, more explicit description of the way therapist support will be provided could be provided so that participants could form realistic expectations. For example, whether support is limited to written feedback or includes video calls.

Lastly, environmental barriers were less frequently reported. However, they revealed a key insight: even motivated participants disengaged when life circumstances changed. This may be crucial for older adults when faced with external problems, they often lack accessible support, whether technical or social (Marler & Hargittai, 2024). These findings demonstrate that continued support from the therapists of the intervention might be needed to help plan addressing unexpected life changes and finding ways to allocate time for participating in the intervention.

Overall, these findings suggest that dropout among older adults in internet-based interventions is rarely due to a single cause. Environmental disruptions, personal preferences, program design, and participants' beliefs about whether the program is right for them can all play a role and often reinforce each other. Since some of the barriers reported by participants were related to the stigma surrounding older adults' lag behind the latest technological advancements, interventions that offer more flexibility, clearer expectations, human contact, and accessible technical support may help retain more participants from this age group.

Conclusions

The results of this study demonstrated that personal, environment-related, program and attitude-related factors were the ones that participants named as reasons for dropping out of the treatment. The results of our study add to the growing body of knowledge on reasons for treatment dropout from internet-delivered interventions (Nomeikaite et al., 2023). Our findings show the need to better align programs with participants' expectations and preferences. Adjustments like more flexible schedules, age-inclusive design, and optional face-to-face interaction could improve engagement. By addressing these concerns, programs may become more effective and accessible for diverse users. Future studies could build on our findings and test the impact of the factors involved in the treatment dropout in a quantitative study. These results should also be replicated in studies with different treatment groups in terms of age but also mental health problems.

Limitations

The main limitation of this study is the small number of participants. Four drop-outs from the intervention group could not be interviewed during the study. This could have introduced selection bias, as the experiences of individuals who agreed to participate

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could not be representative of those who chose not to take part. In other circumstances, with more time, it would have been possible to widen the sample by interviewing dropouts from the control group who, at the moment of these interviews, were using the intervention and dropped out only after. On the one hand, a larger number of participants might have allowed more themes to emerge in the data, giving a more accurate picture of the reasons for dropping out of the intervention. On the other hand, we managed to reach more than two-thirds of dropouts which, given the fact that dropouts are generally hard to reach, is an encouraging achievement. Also, because of the sample of older adults with symptoms of depression generalizing these findings to younger individuals and participating in internet-delivered interventions for other psychological problems is limited and should be investigated further. Moreover, these interviews were not anonymous and, therefore, the participants could have presented more socially desirable answers to the interviewer's questions. Even if the interviewer was not a therapist in the program, he was part of the research team and could have been perceived as one. Finally, some data that we gathered could be interpreted ambiguously and therefore, interview protocols should be adjusted to better capture nuances of participants' experience.

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Preregistration: No preregistration exists for this study.

Reporting Guidelines: This study was reported in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ; Tong et al., 2007).

Social Media Accounts: *Jonas Eimontas:* LinkedIn

Data Availability: The interview data generated and analyzed during the current study are not publicly available due to the sensitive nature of the personal information disclosed.

Supplementary Materials

The Supplementary Materials contain the COREQ checklist (see Getautas et al., 2026S).

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Index of Supplementary Materials

Getautas, T., Lapinskaitė-Vvohlfahrt, E., Andersson, G., & Eimontas, J. (2026S). *Supplementary materials to "Reasons for discontinuing internet-delivered cognitive behavioral therapy-based treatment for older adults with depression: Findings from a qualitative study"* [COREQ checklist]. PsychOpen GOLD. https://doi.org/10.23668/psycharchives.22763

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Research Articles

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Addressing Treatment Non-Response: A Pilot Study of Inhibitory Retrieval–Focused Exposure Therapy

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

Abstract

Background: Inhibitory retrieval (IR-) focused exposure treatment may help overcome treatment non-response in anxiety disorders. However, evidence of its feasibility, acceptance, and effectiveness in this crucial patient group is lacking.

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Method: We successfully re-invited patients with spider phobia who had not responded to the previous virtual reality exposure therapy (SpiderVR study) and responders. Additionally, we recruited healthy controls. Non-responders underwent an IR-focused one-session in vivo exposure with two conditions, i.e., with and without additional affect labeling. Pre- and post- treatment and at a 6-month follow-up, participants underwent clinical assessment, including self-reported symptom severity and a behavioral avoidance test. Applying multilevel models, we examined the feasibility, acceptance, and effectiveness. Exploratively, we described individual long-term trajectories.

Results: The additional IR-focused exposure produced lasting reductions in cognitive and behavioral symptoms in non-responders, with high adherence and acceptance rates. Additional affect labeling during IR-focused exposure had no effect. No associations were found with process variables related to potential mechanisms of change.

Conclusion: These findings suggest that implementing IR-focused exposure is feasible and well-received, offering clinical benefits to non-responders. Results underscore the need for further longitudinal research to optimize therapy for this critical patient group.

Keywords

treatment non-responder, inhibitory retrieval, specific phobia, feasibility and acceptance, long-term trajectories

Highlights

- The study focuses on the critical patient group of non-responders to first-line treatment.
- IR-exposure leads to lasting improvement of cognitive and behavioral symptoms.
- Practitioner and patients show high adherence and acceptance of the IR protocol.

Exposure-based cognitive behavioral therapy (CBT) is the first-line treatment for anxiety disorders (Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften (AWMF) et al., 2021) with medium to large effect sizes (Carpenter et al., 2018; Cuijpers et al., 2016; Hofmann et al., 2012). However, approximately half of patients do not show clinically significant improvement (Gloster et al., 2011; Loerinc et al., 2015) and high drop-out rates and relapses are reported (Craske & Mystkowski, 2006; Fernandez et al., 2015; Scholten et al., 2013; Taylor et al., 2012). Such treatment non-response can have severe consequences, including chronification and increasing societal costs, highlighting the need for optimizing treatment for this critical group of patients. After non-response to at least one form of psychotherapy or psychopharmacological treatment, additional psychotherapy from a variety of treatment approaches (among others cognitive behavioral therapy, third-wave therapies, and psychodynamic therapies) seems beneficial in mood and anxiety disorders (Gloster et al., 2020). However, it has not been investigated so far, which treatment might be feasible and effective in treating non-responders.

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Exposure therapy relies on learning mechanisms that impact the conditioned association between a conditioned stimulus and conditioned fear reaction through repeated confrontation (Craske, 2015; Foa & McNally, 1996). Emotion processing theory (EPT; Foa & McNally, 1996) suggests that confrontation with the feared stimulus activates the neural fear memory that holds the stimulus-fear association. When one experiences a decrease of fear over time due to a repeated or prolonged confrontation with the feared stimulus (i.e., habituation), the fear memory is modified by the new incompatible information. Hence, factors predicting successful treatment outcome according to EPT are the initial fear activation (IFE) and the within-, as well as between-session habituation (WSH and BSH, respectively). Although some findings corroborate the EPT, recent meta-analyses indicate that IFE, WSH and BSH are not reliable predictors of treatment response (Craske et al., 2008; Rupp et al., 2017).

Informed by fear learning and extinction research, inhibitory retrieval (IR) is proposed as a key mechanism underlying successful therapy. This theory suggests two competing associations with the conditioned stimulus: an excitatory and an inhibitory one (Craske et al., 2014, 2022). When confronted with the feared stimulus (e.g., a spider) but the feared outcome (e.g., fainting because of fear) does not occur, an inhibitory association between the stimulus and a safe outcome is formed (e.g., remaining conscious despite the presence of a spider). When confronted repeatedly with the feared stimulus, the new inhibitory association is thought to inhibit the old excitatory one. The fundamental aspect of IR is expectancy violation (i.e., the feared outcome does not occur). The mismatch between expectancy and reality, and the resulting change in expectancy, are thought to drive the formation of new inhibitory associations; importantly, recent findings suggest that the exposure-related learning rate, rather than expectancy violation per se, may be the primary predictor of treatment success (Pittig et al., 2023). Importantly, in contrast to former exposure procedures that had aimed at maximizing habituation (e.g., reducing fear by a certain degree), an exposure session focusing on inhibitory learning is considered successfully completed when the participants' feared outcome does not occur, irrespective of a reduction of the subjective level of fear in that moment. Evidence is increasing for the relevance of expectancy violation and expectancy change for treatment efficacy (Deacon et al., 2013; but also see Krause et al., 2022 for a heterogeneous perspective; Pittig et al., 2023). Guidelines on conducting an IR-focused exposure have been specified by Craske and colleagues (2022).

To our knowledge, the feasibility of the IR approach has not been investigated specifically in non-responders, but might be promising for this specific group: Patients with anxiety disorders show impaired extinction learning and inhibitory regulation (Jovanovic & Norrholm, 2011; Lissek & Grillon, 2010), which may make them less susceptible to exposure therapy (Craske & Mystkowski, 2006; Loerinc et al., 2015) and might explain their treatment non-response. Furthermore, the phenomenon of return of fear, as further facet of non-response, can also be explained by inhibitory learning: As the excitatory

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association between the stimulus and the fear reaction is not erased during exposure, the return of fear can be understood as failed inhibition, allowing excitatory associations to take over again (Bouton, 2002). Thus, enhancing and strengthening those inhibitory associations during exposure might compensate for deficits in extinction learning and offer protection against relapse.

Within the conceptual frame of IR affect labeling, i.e., the self-verbalizing of one´s current feelings, has been suggested to optimize the IR-focused exposure (Craske, 2015; Craske et al., 2022; Torre & Lieberman, 2018). Investigating a sample of spider-fearful participants, Kircanski et al. (2012) compared the effects of affect labeling, other forms of emotion regulation, and exposure alone on exposure intervention outcome. While there were no differences in self-reported fear measures between conditions, in physiological and behavioral measurements of fear, the affect labeling condition outweighed the other conditions, i.e., patients in the affect labeling condition showed reduced skin conductance and greater approach behavior when confronted with a spider. This hints that affect labeling is a rather implicit form of emotion regulation (Torre & Lieberman, 2018). Several studies have found that affect labeling positively influences exposure intervention outcomes (Kircanski et al., 2012; Memarian et al., 2017; Niles et al., 2015) and well-being (Memarian et al., 2017). Critically, affect labeling has been found to be especially beneficial for those patients showing deficits in extinction learning and emotion regulation before treatment (Niles et al., 2015). Thus, affect labeling may be a useful technique to optimize treatment for non-responders, but has not been investigated so far.

In summary, despite the high number of treatment non-responders, studies investigating the feasibility and effectiveness of IR-focused exposure are lacking. To fill the gap, in this pilot study we re-invited patients suffering from spider phobia and who did either not respond to or experience a return of fear after a former virtual reality exposure therapy (VRET). We aimed at investigating the feasibility, acceptance and efficacy of an exposure intervention following the IR approach in treatment non-responders. Exploratively, we investigated the add-on treatment effect of applying affect labelling during exposure. In additional exploratory analyses, we tested the effects of further process variables on treatment outcomes.

Method

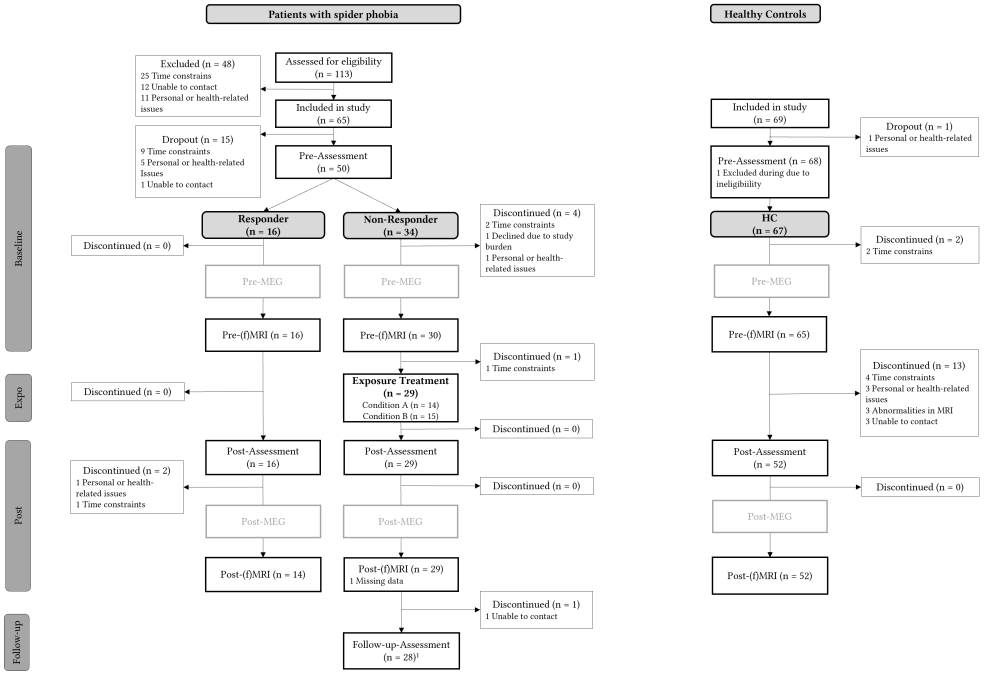
Sample

We successfully re-invited n = 34 patients with spider phobia who had not responded to the previous virtual reality exposure therapy (SpiderVR study), and n = 16 responders. Additionally, we recruited n = 67 healthy controls (for study flow see Figure 1).

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Figure 1

Flowchart of Study Procedure and Drop-outs



Note. Expo = inhibitory retrieval exposure; (f)MRI = (functional) magnetic resonance imaging; MEG = magnetoencephalography; HC = healthy controls.
[1]One participant has incomplete Post-(f)MRI data, but complete follow-up data.

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As for some participants post-intervention data was missing, our final sample comprised n = 97 participants with clinical data available at baseline and post treatment. Characteristics of our final sample (n = 29 non-responders (NR), n = 16 responders (R), n = 52 healthy controls (HC)) are depicted in Table 1 (for characteristics of the intention-to-treat (ITT) sample see Supplementary Table S1). Spider-phobic participants, verified by the Structured Clinical Interview for DSM-IV (SCID, Wittchen et al., 1997), were re-invited from the earlier SpiderVR study (ClinicalTrials.gov, ID: NCT03208400). Participants had to be aged between 18 and 65 years, right-handed (due to MRI measurements, not part of this manuscript) and fluent in German. For the HC sample, any acute or lifetime mental disorder was an exclusion criterion. For re-invited participants from the SpiderVR study any lifetime substance dependency, schizophrenia or bipolar disorder were exclusion criteria. Further exclusion criteria for all participants were the current use of benzodiazepines or opiates, any neurological abnormalities, organic mental disorders, dementia, brain injuries, or magnetic resonance imaging (MRI) contraindications. Participants received compensation for their participation.

Table 1

Sample Characteristics at Baseline

				Comparison NR vs R		Comparison NR vs HC	
Variable	**NR**	**R**	**HC**	$\chi^2/t\,(df)$	p	$\chi^2/t\,(df)$	p
Sample size	29	16	52				
Female [n (%)]	25 (86.2%)	15 (93.8%)	42 (80.8%)	1.67 (2)	.435	0.594 (1)	.441
Age	28.07 (7.58)	31.31 (10.32)	27.76 (8.07)	-1.21 (43)	.234	0.15 (79)	.879
Years of education	13.72 (2.07)	13.69 (2.44)	13.96 (1.80)	0.05 (43)	.958	-0.54 (79)	.592
BAT baseline	128.38 (81.05)	13.59 (28.18)	1.54 (8.72)	6.91 (38.19)[a]	**< .001**	8.40 (28.36)[a]	**< .001**
SPQ baseline	20.90 (3.59)	10.44 (3.50)	3.00 (2.28)	9.44 (43)	**< .001**	24.27 (40.83)[a]	**< .001**
BDI	3.00 (4.71)	1.56 (1.50)	1.98 (3.11)	1.51 (36.97)[a]	.139	1.17 (79)	.245
ASI-3	14.55 (10.86)	9.06 (4.14)	11.85 (8.88)	2.42 (39.58)[a]	**.020**	1.12 (79)	.229
CERQ functional	6.73 (0.99)	6.49 (1.44)	6.69 (1.38)	0.67 (43)	.506	0.18 (73.83)[a]	.862
CERQ dysfunctional	4.35 (1.21)	4.47 (0.99)	4.19 (1.03)	-0.35 (43)	.728	0.62 (79)	.538
Current comorbidities	Other specific phobia (n = 3)	none	none	n.a.	n.a.	n.a.	n.a.

Note. Sample includes participants who completed baseline and post assessment of current study; NR = non-responders to the SpiderVR study as assessed at baseline; R = responders to the former SpiderVR study as assessed at baseline; HC = additionally recruited healthy controls; Information given as mean (standard deviation); BAT = Behavioural Avoidance Test; SPQ = Spider Phobia Questionnaire; BDI = Beck Depression Inventory; ASI-3 = Anxiety Sensitivity Index; CERQ = Cognitive Emotion Regulation Questionnaire.
[a]corrected for inhomogeneous variances. Significant p-values appear in bold.

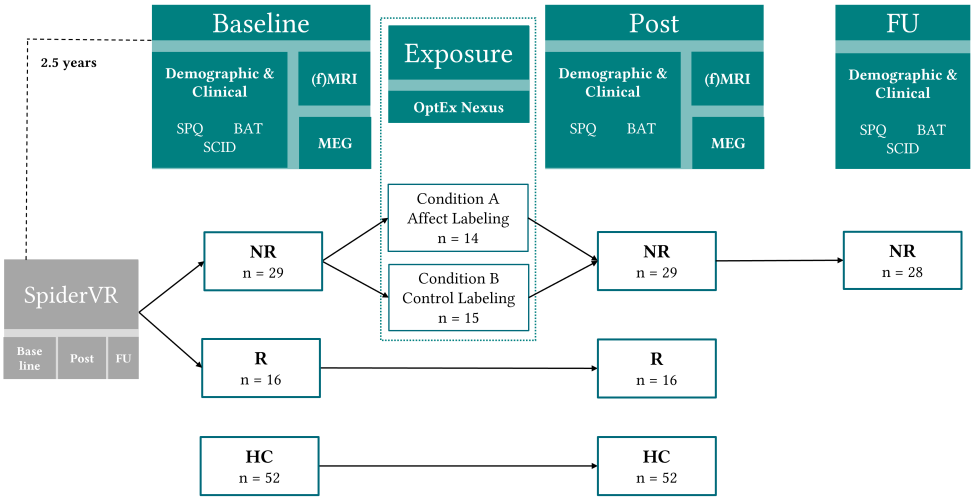
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Procedure

Participants underwent a baseline assessment (see Figure 2). This included the SCID for DSM-IV conducted by a trained medical or psychology student, the *spider phobia questionnaire* (SPQ), a standardized *behavior avoidance test* (BAT) and further clinical questionnaires. Furthermore, blood-sampling, magnet resonance imaging (MRI) and magnetoencephalography (MEG) were conducted, but not relevant in this context. At baseline, the spider-phobic participants were categorized into responders and non-responders (see Measurements) to the former virtual reality exposure treatment (VRET). Only non-responders received the additional IR-focused in-vivo exposure treatment with two intervention arms. After treatment, the clinical and neurobiological assessments were repeated. Responders and the additionally recruited HC group received the same baseline and post-assessment after a corresponding interval. To test for long-term clinical effects of our treatment, non-responders underwent an additional 6-month follow-up assessment (including SPQ, BAT and SCID). Note that due to pandemic-related restrictions during this study's recruitment process, intervals between baseline and post assessments between the groups did not correspond as intended (see Supplementary Material A1).

Figure 2

Schematic Illustration of Study Procedure



Note. Sample includes: participants who completed baseline assessment and post-assessment of current study. The label 2.5 years refers to the average interval between the SpiderVR baseline and baseline of current study. FU = follow-up; (f)MRI = (functional) magnetic resonance imaging; MEG = magnetoencephalography; NR = non-responders to the former SpiderVR study as assessed at baseline; R = responders to the former SpiderVR study as assessed at baseline; HC = additionally recruited healthy controls. Information given as mean (standard deviation); BAT = Behavioural Avoidance Test; SPQ = Spider Phobia Questionnaire; SCID = Structured Clinical Interview for DSM-IV; OptEx Nexus = Optimal Exposure Nexus sensu Craske et al. (2022).

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Measurements

Markers for Feasibility, Proof-of-Concept and Acceptance

Markers for feasibility and proof-of-concept of the applied IR-focused exposure were operationalized by recording the *duration* of (i.e., total time confronted with the spider over all completed scenarios) and *the maximal fear* (0-100%) elicited during the exposure session, as well as *deviations from the exposure protocol*, including drop-outs during exposure, adaptations made to the exposure procedure and *use of coping strategies*. The classification of reported coping strategies was done by two graduate psychology students (interrater reliability Cohen's kappa = 78.18); discrepancies were resolved by one of the first authors (ES).

Acceptance of the IR-exposure was assessed in the postexposure protocol: Participants reported each on scale from 0-100% their satisfaction with the exposure procedure and their willingness to repeat the same treatment, and whether they would recommend the treatment to a friend (yes or no).

Primary and Secondary Outcome

Registered primary outcome measure (registration in Deutsches Register Klinischer Studien: DRKS00022379, registration date 29/11/2019) was the SPQ, a self-report questionnaire assessing fear and avoidance of spiders using 31 items (true or false) (Hamm, 2006; Klorman et al., 1974). As registered secondary outcome, we used the BAT: A tarantula (species: *grammostola rosea*) was placed in a transparent box of plexiglass with a closed lid. The box was placed on a slide three meters away from the participant, who was then asked to slowly bring the box as close as possible using a crank. The final distance between participant and spider (in centimeters, quantification of avoidance behavior) was recorded.

Participants considered responders at baseline had to show at least a 30% reduction in SPQ scores and a 50% reduction in BAT scores from before the previous VRET to the baseline assessment of the current study (average interval between assessments = 29.92 months, *SD* = 5.20). If only one or no criteria was met, participants were classified as non-responders; this group thus included both consistent non-responders and participants who experienced return of fear. The same classification of response was used following IR-exposure.

A complete list of all clinical questionnaires used can be found in the Supplementary Table S0.

Process Variables

Process variables were derived from the pre and postexposure protocol, and fear assessments during exposure: (1) expectancy and expectancy change: Before exposure, the mean expectancy for the feared outcome (expectancy pre) was assessed. After exposure,

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expectancy for the feared outcome (adjusted expectancy) was assessed and used for the calculation of expectancy change (EC), i.e., EC = (expectancy pre – adjusted expectancy)/expectancy pre (Pittig et al., 2023). Expectancy violation (EV) was defined as the difference between expectancy for the feared outcome and its actual occurrence during the exposure treatment. As none of the feared outcomes occurred, the expectancy violation corresponds to the expectancy assessed before the treatment, i.e., expectancy pre (see also Pittig et al., 2021).

Fear expectancy (FE) was assessed before the beginning of each scenario ("How high do you think your fear will be in the following situation?").

The individual within-session fear reduction (WSFR) was calculated as the absolute difference between maximal and minimal fear rating within each scenario and then averaged over all completed scenarios.

The initial fear activation (IFA) represents the fear rating when confronted with the spider for the very first time within the exposure treatment.

To disentangle indicators of inhibitory learning, we assessed in a postexposure protocol whether the pre-defined feared outcome (e.g., "I'll faint from fear!"; "The fear will never go away!"; "The fear will completely paralyze me, and I won't be able to break free from it!") had occurred. The classification of reported learning experience was done by two graduate psychology students (interrater reliability Cohen's kappa = 71.84); discrepancies were again resolved by one of the first authors (ES).

Exposure Treatment

The exposure treatment consisted of five predefined exposure scenarios ((1) Being in the same room with a spider in an open glass jar, (2) holding the glass jar with a spider, (3) touching a spider with a cotton swab, (4) touching a spider with one finger, (5) holding the spider in one's hand.) and was conducted by a psychologist undergoing a post-graduate training in CBT (ES) or a psychotherapist (JB). Critically, before confrontation with a spider, the OptEx Nexus adapted from Craske et al. (2022) was completed: It identifies the presumed core principals underlying IR, including the most feared outcome, its operationalization, the expected time between preceding bodily symptoms of fear and the feared outcome itself, and the expectancy that the feared outcome will occur. Participants were regularly asked to report their current fear on a scale from 0-100% during exposure and directly before and after completion of each scenario. Importantly, a scenario was regarded as "finished" when the predefined expected feared outcome did not occur, independent of the amount of fear in that moment. If a scenario did not provoke any of the targeted fear symptoms, thus making it impossible to test the occurrence of the feared outcome, the experimenter immediately continued with the next scenario.

Two conditions were applied within the IR-focused exposure: In the affect labeling condition, participants were additionally asked at least three times per scenario to identify and explicitly verbalize their current feelings ("How would you describe your predom-

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inant feeling at the moment?"). In the control condition, patients were asked to answer self-related but rather non-emotional questions (e.g., "What color is your bike?"). Allocation to condition was randomized across participants. Randomization was performed using the RAND function in Excel, which uses the Mersenne Twister MT19937 (32-bit) algorithm. No blinding protocol was applied.

Statistical Analysis

The pre-registered statistical analysis plan (SAP), the deviation protocol and the analysis code can be found here: https://osf.io/8ug9x/overview. To address our main objectives, multilevel models (MLMs) were conducted with the *nlme* package in *R*, following guidelines by Aguinis et al. (2013). Pre-assumptions for MLMs were tested (see Supplements Part D). For each dependent variable (SPQ and BAT scores), a two-level MLM was set up with our data (random effects, Level 1 units: SPQ and BAT scores at different time points) being nested in participants (fixed effect, Level 2 units). To test the effect of our treatment in NR in comparison to R, and HC, a random intercept and random slope MLM was conducted with the predictor time (baseline, postassessment), the predictor group (NR, R, HC) and their cross-level interaction. Next, to test the effect of affect labeling during the exposure session, random intercept and random slope MLMs on SPQ and BAT scores were conducted for NR, with the predictor time (baseline, postassessment, follow-up), the predictor condition (affect labeling, control labeling), and their cross-level interaction. Finally, to test the effect of indicators of IR (expectancy change, expectancy violation) and further exploratory process variables (within-session fear reduction, initial fear activation, and fear expectancy) on treatment outcome, the same model set up was used. A significance level of $p < .025$ was assumed for main analyses regarding the two outcome variables (SPQ and BAT) and $p < .05$ for all other analyses. Effect sizes for fixed effects were estimated with semi-partial R^2 (or η^2) (2013). Model fit was estimated using Pseudo-R^2, reflecting the variance explained by the fixed effects, and the variance explained by the entire model, including both fixed and random effects (Nakagawa et al., 2017).

Effect sizes for changes within the non-responder group (which received the treatment) were calculated using Cohen's *d* for paired samples, defined as the mean pre–post change divided by the standard deviation of the change scores.

Results

Feasibility, Proof-of-Concept and Acceptance of Exposure Treatment

The mean duration of the exposure session was 57.83 min (*SD* = 21.32, range: 25-106, *Mdn* = 56). The mean maximum fear elicited during exposure was 94.21% (*SD* = 10.37,

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range: 50-100%, *Mdn* = 100%). In three participants (NR), the exposure procedure needed to be slightly adapted. To assess the fear rating directly after a scenario's completion, the spider in the glass jar needed to be placed outside of the room. Overall, 72.4% of participants completed the most difficult scenario (taking spider in hand), 86.2% completed the second most difficult (touching spider with one finger), and 89.7% completed the third most difficult scenario (touching spider with cotton swab). None of the participants dropped out during the exposure. In the postexposure protocol, the majority of participants (86.2%) reported the usage of strategies to cope with the fear during the exposure treatment. However, only 16.67% of them reported strategies typically classified as dysfunctional safety or avoidance behavior (Meyer et al., 2019; Telch & Lancaster, 2012), such as cognitive avoidance (e.g., thinking about the next vacation) or behavioral avoidance (playing with my fingers). By contrast, 83.3% reported strategies that could be classified as functional emotion regulation, such as positive self-verbalization (encouraging oneself) and mindfulness-based techniques (breathing calmly).

Participants showed a mean satisfaction with the exposure procedure of 95.7% (*SD* = 9.42) and a willingness to repeat the treatment of 83.1% (*SD* = 26.64). Satisfaction and willingness to repeat were independent from treatment success, i.e., they did not correlate with reduction in SPQ (satisfaction: $r = .02$, $p < .939$, $n = 29$; willingness: $r = .04$; $p = .845$, $n = 29$) nor BAT (satisfaction: $r = .06$, $p < .742$, $n = 29$; willingness: $r = .19$, $p < .323$, $n = 29$). All participants reported that they would recommend the treatment to a friend. To our knowledge, there were no unintended negative effects of treatment.

Treatment Effects

Response Rates

The treatment reached a combined response rate of 41.4%. The same response rate was observed at the 6-month follow-up. At 6 months after treatment, 32.1% of the previous non-responders fulfilled the diagnostic criteria for remission based on SCID.

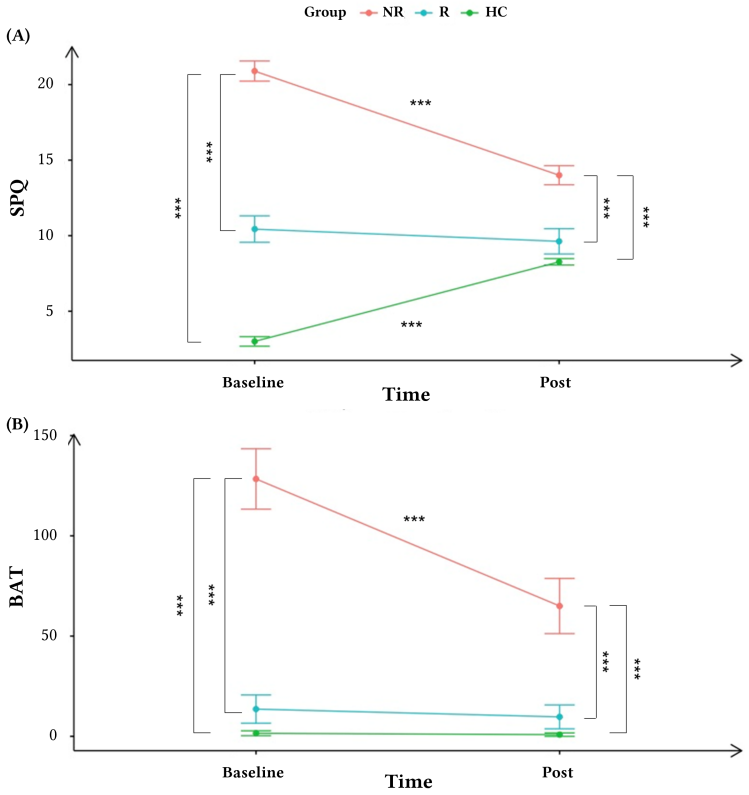
Effect of Group – Treatment Group (NR) vs. Control Groups (R, HC)

SPQ — The MLM revealed the expected interactions of group and time on SPQ (Figure 3A). From baseline to post assessment, SPQ values significantly decreased in NR ($b = -6.90$, $SE = 0.69$, $t(95) = -10.01$, $p < .001$) but not in R ($b = -0.81$, $SE = 1.54$, $t(95) = -0.53$, $p = .599$). Unexpectedly, in HC SPQ values significantly increased over time ($b = 5.27$, $SE = 0.50$, $t(95) = 10.53$, $p < .001$). However, they remained subclinical with a mean value of 8.27 (*SD* = 1.54). At each time point, non-responders showed significantly higher values than responders, and in comparison, to HC (see Table 2 and Supplementary Table S2). Responders and HC did differ at baseline ($b = 7.44$, $SE = 0.84$, $t(94) = 8.87$, $p < .001$) but not at post assessment ($b = 1.36$, $SE = 0.73$, $t(94) = 1.86$, $p = .066$). Rerunning the model controlling for the number of days between baseline and post assessment did not

significantly alter results. Based on SPQ, the effect size within the treatment group was Cohen's $d = 2.24$.

Figure 3

Treatment Effects



Note. Mean SPQ (A) and BAT (B) at baseline and postassessment. Results showed that the inhibitory retrieval exposure reduced symptom severity in (former) non-responders on both the cognitive and behavioral levels at posttreatment. However, at each time point (former) non-responders still showed higher symptom severity on cognitive and behavioral levels compared to responders and healthy controls. For the exact mean values and standard deviations by group and time, see Table 2. NR = non-responders to the former SpiderVR study as assessed at baseline; R = responders to the former SpiderVR study as assessed at baseline; HC = additionally recruited healthy controls. Error bars indicate standard error.
***$p < .001$.

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Table 2

Mean SPQ and BAT Scores by Group and Time

	Baseline		Post		FU	
Group	SPQ *M* (*SD*)	BAT *M* (*SD*)	SPQ *M* (*SD*)	BAT *M* (*SD*)	SPQ *M* (*SD*)	BAT *M* (*SD*)
NR	20.90 (3.59)	128.38 (81.05)	14.00 (3.40)	65.00 (74.15)	13.78 (3.56)	52.73 (60.80)
R	10.44 (3.50)	13.59 (28.18)	9.63 (3.34)	9.70 (23.01)	n.a.	n.a.
HC	3.00 (2.28)	1.54 (8.72)	8.27 (1.53)	0.85 (6.10)	n.a.	n.a.

Note. Response to former virtual reality exposure therapy assessed at baseline of current study: NR = non-responders; R = responders; HC = additionally recruited healthy controls; SPQ = Spider Phobia Questionnaire; BAT = Behavioral Avoidance Test.

BAT — The MLM revealed the expected interactions of group and time on BAT scores (Figure 3B). Simple slopes for each group and each time point revealed that from baseline to post assessment, BAT scores significantly decreased in NR (b = -63.38, SE = 5.63, $t(94)$ = -11.25, p < .001) but neither in R (b = -4.42, SE. = 10.43, $t(94)$ = -0.42, p = .672) nor HC (b = -0.69, SE = 4.98, $t(94)$ = -0.14, p = .890). At each time point, NR showed significantly higher values than R, and in comparison, to HC (see Table 2 and Supplementary Table S3). Responder and HC neither differed at baseline (b = 12.06, SE = 13.18, $t(94)$ = 0.91, p = .363) nor at post assessment (b = 8.23, SE = 12.07, $t(94)$ = 0.68, p = .497). Rerunning the model controlling for days between baseline and post assessment did not significantly alter results. Based on BAT, the effect size within the treatment group was Cohen's d = 1.16.

Exploratory Analysis of Effect of Condition (Affect Labeling vs. Control Labeling)

The affect labeling and the control labeling group did not differ in demographic and clinical variables at baseline (see Supplements Table S4). No interaction effect of condition and time on SPQ or BAT values was found in the MLM within the group of NR (see Supplementary Tables S5 and S6, and Figure S1). The analyses however confirmed the main effect of time in NR across both conditions. This effect proved to be robust when repeating the analyses with the ITT sample (see Supplementary Tables S7 and S8). The random intercepts (individual SPQ and BAT scores at baseline) were negatively correlated with the random slopes (individual changes over time), indicating that the higher the symptom severity at baseline, the steeper the reduction from baseline to post assessment and to follow-up, respectively (SPQ: baseline to post assessment: $r(27)$ = -.443, p = .0161, baseline to follow-up: $r(27)$ = -.359, p = .056; BAT: baseline to post assessment: $r(27)$ = -0.452, p = .014, baseline to follow-up: $r(27)$ = -.683, p < .001). Since condition had no differential effect on treatment outcome, in the following analyses both intervention arms were treated as one.

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Indicators of Inhibitory Learning During Exposure and its Effect on Treatment Outcome

When explicitly asked in the post-exposure protocol, all participants reported that their pre-defined feared outcome had not occurred. When asked in an open question about their learning experience ("What happened instead?"/"What did you learn?"), 34.5% reported an outcome directly contradicting their pre-defined feared outcome (e.g., "I didn't go crazy but stayed in control of myself"). Other answers could be classified as learning experiences related to self-efficacy, new knowledge about spiders, violation of expected fear, and new strategies of coping with fear.

Expectancy Change — Before exposure, the mean expectancy for the feared outcome (expectancy pre) was 52.36% (SD = 26.43). After exposure, expectancy for the feared outcome (adjusted expectancy) was reduced significantly ($t(27) = 6.73$, $p < .001$) to 17.43% (SD = 18.31). Expectancy change had no effect on treatment outcome at postassessment or follow-up, neither in SPQ (EC*$\text{Time}_{\text{BaselinevsPost}}$: b = -0.62, SE = 1.72, $t(51) = -0.36$, p = .719; EC*$\text{Time}_{\text{BaselinevsFU}}$: b = -1.55, SE = 1.68, $t(51) = -0.92$, p = .362) nor BAT (EC*$\text{Time}_{\text{BaselinevsPost}}$: b = 10.01, SE = 31.13, $t(51) = 0.32$, p = .749; EC*$\text{Time}_{\text{BaselinevsFU}}$: b = 39.27, SE = 29.88, $t(51) = 1.31$, p = .195).

Expectancy Violation — The MLM with SPQ values at follow-up indicated a significant interaction between EV and Time (postasessment: EV*$\text{Time}_{\text{BaselinevsPost}}$: b = -0.03, SE = 0.02, $t(51) = 1.22$, p = .229; follow-up: EV*$\text{Time}_{\text{BaselinevsFU}}$: b = -0.05, SE = 0.02, $t(51) = -2.60$, p = .012); however, a simple slope analysis revealed that this effect was merely driven by the influence of EV on SPQ values at baseline (b = 0.05, SE = 0.02, $t(26) = 2.10$, p = .046), i.e., higher SPQ values before exposure where associated with higher EV. EV had no effect on SPQ values at follow-up (b = - 0.01, SE = 0.03, $t(26) = -0.36$, p = .724). No interaction effect of EV and time was found on BAT values (postassessment: EV*$\text{Time}_{\text{BaselinevsPost}}$: b = 10.01, SE = 31.13, $t(51) = 0.32$, p = .749; follow-up: EV*$\text{Time}_{\text{BaselinevsFU}}$: b = 39.27, SE = 29.88, $t(53) = 1.31$, p = .195).

None of the explored further process variables i.e., WSFR, IFA, and FE was found to influence treatment outcome (see supplementary Material E).

Discussion

The current study investigated the feasibility, acceptance, and effectiveness of an IR-focused exposure in patients with spider phobia, who did not respond to a former VRET. Supporting the proof-of-concept and the treatment's feasibility, exposure duration was less than an hour, and there was overall adherence to the structured assessment and to the operationalization of the most feared outcome using the OptEx Nexus (Craske et al., 2022). The treatment was highly accepted by participants, independent of treatment

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outcome. Further, our exposure treatment reduced symptom severity in VRET-non-responders on the behavioral and cognitive level. The improvements were maintained over a period of 6 months. We did not find an additional beneficial effect of using affect labeling during exposure. Process variables capturing potential mechanisms of change in exposure (i.e., expectancy change, expectancy violation, within-session-fear reduction, initial fear activation, and fear expectancy) were not found to influence treatment response.

With a response rate of 41%, our intervention's effectiveness was generally comparable to other studies using exposure-based treatment. While this rate is slightly lower than what has been reported for one-session exposure treatments (Andersson et al., 2009, 2013; Davis et al., 2019; Ollendick et al., 2009), this difference should be interpreted in light of the sample characteristics. In contrast to previous studies, our sample consisted exclusively of individuals who had not responded to a prior exposure session or had experienced a return of fear. As such, the sample likely represents a particularly difficult-to-treat population, which may account for the somewhat lower response rate. Comparing our effect sizes specifically to those obtained in treatment studies on non-response (Gloster et al., 2020), we see overall higher effect sizes in our sample. While the magnitude of symptom change appears promising, we cannot determine to what extent the observed improvements are specifically attributable to the IR-focused intervention, as there is no treatment control group. Although we found substantial reduction of cognitive and behavioral symptoms as measured with SPQ and BAT, remission based on the SCID at 6-month follow-up was reached by only few patients, showing the relevance of applying distinct outcome measures to get the complete image. Moreover, non-responders to the IR intervention continued to show higher symptom levels than responders to VRET, underscoring that symptom improvement is highly individual (Lukaschek et al., 2019; Pittig et al., 2021), and the need to identify markers that can inform more personalized treatment approaches.

One of our main goals was to test the practicability and effectiveness of an IR-focused approach, which might solve some difficulties practitioners face following a strict habituation focused approach. Whereas in habituation-focused exposure, the rationale is to stay in the situation until the fear decreases by a certain degree, which can lead to long, strenuous and unpredictable exposure sessions, in IR-focused exposure, the feared outcome and the expected time needed to evaluate its occurrence are estimated before treatment regardless of fear ratings. In light of current studies stating that only about half of practitioners frequently apply exposure interventions in treating anxiety disorders (Schumacher et al., 2018), identifying barriers to the use of exposure therapy (Becker-Haimes et al., 2017; Moses et al., 2023) and providing a structured, more predictable approach might lead to more frequent use of exposures in practice. Furthermore, the low drop-out rates and patients' positive evaluations indicate high acceptance of the overall exposure procedure. In light of treatment non-response, this is of particular

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relevance, since patients generally are less likely to seek further treatment if an initial treatment was not successful (Bokma et al., 2019; Conway et al., 2017).

We did not find conclusive evidence for IR as the mechanism of change. This raises the question if our exposure protocol indeed sufficiently targeted IR. Craske et al. (2022) identified the following four principles as fundamental for an IR approach: expectancy violation, attention to the feared stimulus/situation, removal of safety signals, and mental rehearsal after exposure. It is likely that our treatment fulfilled these principles: All exposure sessions were therapist guided, assuring attention to the feared stimulus and removal of the safety signals, conducted using the structured OptEx Nexus protocol, again assuring expectancy violation/ removal of safety signals. Further, we found indicators of strong expectancy violation, as well as expectancy change, as there was a significant change in expectancy of the feared outcome from pre- to post- intervention. Finally, few participants reported applying (dysfunctional) safety behaviors. Although being confident that our exposure protocol adequately implemented the most important compounds of IR, we could not find an effect of expectancy violation and change on cognitive and behavioral symptoms. This is in line with previous work of our group and others, where fear expectancy violation has not been shown as relevant predictor for treatment outcome in patients with spider phobia after VRET (Roesmann et al., 2022) and patients with claustrophobia (Krause et al., 2022). Clinical studies investigating the role of expectancy violation are scarce, heterogeneous regarding operationalization of expectancy violation, and inconsistent regarding their findings (Deacon et al., 2013; Pittig et al., 2023). Interestingly, Pittig et al. (2023), found that it is not expectancy violation per se, but the exposure-related learning rate and the change of expectancy from one session to the other that were associated with treatment outcomes across multi-session exposure-based treatment for anxiety disorders. Furthermore, recent transdiagnostic research on expectancy violation provides initial indications, that the relationship between expectancy violation and symptom change might not be linear (Rief et al., 2022).

At the same time, it is possible that mechanisms of change beyond IR contributed to the observed symptom reduction but were not captured by the assessed process variables. Notably, we also did not find evidence that variables reflecting habituation-based mechanisms (i.e., within-session fear reduction) predicted treatment outcome, suggesting that neither inhibitory retrieval nor habituation processes, as operationalized in the present study, fully account for symptom change. It is possible that other affective or cognitive processes, such as changes in disgust (Benito et al., 2025; Mitchell & Olatunji, 2026), may have contributed but were not sufficiently captured by our assessed variables or were less strongly targeted by the applied exposure protocol. Future studies should therefore consider these additional mechanisms to better understand the pathways underlying treatment effects.

In addition, basic research from fear-conditioning studies might be promising to disentangle the effects of expectancy violation. A recent study found that stronger ex-

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pectancy violation, as well as higher awareness of it, resulted in a faster update of threat expectancies, but did not affect return of fear, except for skin conductance (Stemerding et al., 2023). However, another study found a positive effect of expectancy violation on directly following threat ratings, but this did not last up to 24 hours (Gromer et al., 2023).

We did not find an additional enhancing effect of affect labeling on symptom change in our study. This may be attributable to the relatively small sample size of the non-responder group, which limits the power to detect subtle between-condition differences. In addition, the distinction between the affect labeling and control condition may have been less pronounced than intended. While the control condition avoided explicit emotional labeling, participants were still repeatedly asked to report their current level of fear, which may have engaged emotional processing similar to the affect labeling condition. Moreover, both conditions likely involved some degree of attentional shift away from the feared stimulus, either toward internal emotional states or neutral, self-referential content, making a simple distraction account unlikely. Consistent with this, fear activation during exposure was comparable across conditions. Future studies with larger samples and more clearly differentiated control conditions are needed.

When interpreting our results, one needs to consider the following limitations. Even though we included two control groups, our study design lacked an active control group due to our focus on the restricted sample of non-responders. Thus, our study is not suited to compare the effectiveness of in-vivo over VRET, nor cannot it rule out the possibility that some of the improvement might be due to switching from one treatment to the other. Implementing IR within standardized VRET is not trivial, as IR requires individualized testing of each participant's feared outcome. Following this, it is also important to note that both approaches, namely in-vivo IR-based exposure and VRET, likely engage multiple mechanisms of change to varying degrees. In practice, inhibitory retrieval and habituation processes are difficult to disentangle and often co-occur. For example, the non-occurrence of a feared outcome is typically accompanied by a reduction in fear, while decreasing fear may, in turn, reinforce the expectation that the feared outcome will not occur. Also, we cannot rule out the possibility that our effect was simply due to an increase of exposure dose. However, the very long interval between the two single exposure sessions makes this appear unlikely. Further, the sample size was small and restricted to VRET non-responders, limiting statistical power and generalizability. This constraint may have reduced the ability to detect small effects, such as differences between the affect labeling and control conditions, and precluded meaningful subgroup analyses.

Concluding, our study showed initial evidence that a one-session treatment focusing on inhibitory retrieval in patients with spider phobia who did not respond to a prior one-session VRET is generally feasible, accepted and effective. Nevertheless, there is an urgent need to better identify who responds to what type of treatment and to identify what non-responders need. Thus, sophisticated research should be done on mechanisms

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of change during exposure treatment and disease trajectories to address the issue of treatment non-response.

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Ethics Statement: The study protocol has been approved by the Ethics Committee of the University of Münster (proposal number 2019-293-f-S).

Preregistration: This trial was registered at Deutsches Register Klinischer Studien (DRKS00022379, registration date 29/11/2019). The study protocol, the pre-registered statistical analysis plan (SAP), and the deviation protocol can be found via OSF (https://osf.io/8ug9x/files/osfstorage).

Reporting Guidelines: The study was reported in accordance with the CONSORT 2025 reporting guidelines.

Data Availability: Code and data are publicly available: https://osf.io/8ug9x/overview

Supplementary Materials

The Supplementary Materials contain the following items:

- Preregistration for the study (Leehr et al., 2019S; Schrammen et al., 2026S)
- Research data and analysis code (Schrammen et al., 2026S)
- Additional materials (Schrammen et al., 2026S):
  - Part A – Additional Details Methods
    1. Time intervals between assessment for each group
  - Part B – Tables

    Table S0. Clinical Questionnaires assessed.
    Table S1. Demographic Characteristics for our ITT Sample at Baseline.
    Table S2. Regression Table for Treatment Effect on SPQ – Fixed and Random Effects.
    Table S3. Regression Table for Treatment Effect on BAT – Fixed and Random Effects.
    Table S4. Non-responder Treatment Groups at Baseline.
    Table S5. Regression Table for Treatment Effect on SPQ – Fixed and Random Effects.

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Table S6. Regression Table for Condition Effect on BAT – Fixed and Random Effects.
Table S7. Regression Table for Treatment Effect Within NR ITT Sample on SPQ.
Table S8. Regression Table for Treatment Effect Within NR ITT Sample on BAT.
Table S9. Fear ratings during exposure session for each condition.

- Part C – Figures
  Figure S1. Effect of Condition.
- Part D – Model Assumptions
- Part E – Additional Details Results
- Results for the Exploratory Analyses of Further Process Variables

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Leehr, E. J., Schrammen, E., Böhnlein, J., Roesmann, K., Junghöfer, M., Lueken, U., Straube, T., Herrmann, M. J., Breuer, F., & Dannlowski, U. (2019S). *Optimization of exposure therapy by enhancing inhibitory learning mechanisms – Investigation of spider-phobic non-responders to virtual reality exposure therapy* [Preregistration; ID: DRKS00022379]. German Clinical Trials Register. https://drks.de/search/en/trial/DRKS00022379/details

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

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Abstract

Background: Trait emotional intelligence (trait EI) has been linked to mental health outcomes, but little is known about disorder-specific emotional profiles in clinical populations. Identifying such profiles may inform transdiagnostic models and tailored interventions.

Method: In this cross-sectional study, we compared trait EI across individuals with depression (n = 200), anxiety-related disorders (n = 61), or insomnia (n = 47) and matched non-clinical controls (N = 608 total). All participants completed the Trait Emotional Intelligence Questionnaire – Short Form (TEIQue-SF). Group differences were examined for the global score and four subscales (Well-being, Self-control, Emotionality, Sociability).

Results: All clinical groups scored significantly lower than their respective controls on the TEIQue-SF global score and all subscales (all ps < .001). Between clinical groups, disorder-specific patterns emerged: Individuals with depression scored lower than those with insomnia on global trait EI and Well-being, reflecting diminished positive affect and life satisfaction. The insomnia group showed higher Self-control scores than the depression and anxiety groups, though the insomnia–anxiety difference was attenuated after controlling for age. No other significant differences were found between clinical groups.

Conclusion: Findings highlight robust trait EI deficits across depression, anxiety, and insomnia, alongside disorder-specific patterns in Well-being and Self-control. These results emphasize the need to consider demographic factors and emotional competencies in clinical research and give some indication that trait EI may be a promising target for transdiagnostic assessment and intervention.

Keywords

trait emotional intelligence, depression, anxiety, insomnia, psychopathology, mental health, transdiagnostic

Highlights

- Trait emotional intelligence (EI) was lower across all four dimensions in depression, anxiety, and insomnia vs. controls.
- Trait EI profiles showed both shared impairments and disorder-specific differences.
- Depression was associated with lower Well-being than insomnia.
- Insomnia showed higher Self-control than depression; differences from anxiety were age-dependent.

Emotional competencies, defined as the ability to perceive, access, understand, manage, and regulate emotions, are central to social functioning and mental health (Mayer & Salovey, 1997). Many mental disorders involve emotional dysregulation, which is associated with excessive fear in anxiety, reduced positive affect in depression (American Psychiatric Association, 2013), and irritability and emotion-recognition problems in insomnia (de Almondes et al., 2020).

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Considering the importance of emotional competencies in psychological functioning, accurate assessment of the aforementioned domains is crucial. The Trait Emotional Intelligence Questionnaire (TEIQue; Petrides, 2009) and its short form (TEIQue-SF) were developed to assess key emotional competencies, also described as "trait emotional intelligence" (trait EI). Trait EI is conceptualized as a constellation of emotion-related self-perceptions and dispositions assessed via self-report questionnaires and rating scales (Petrides et al., 2007). Within this framework, trait EI is situated within the personality domain rather than conceptualized as a cognitive ability or a facet of general intelligence (Petrides & Furnham, 2001; Petrides et al., 2007). This conceptual positioning is particularly relevant given the longstanding debate surrounding the use of the term "intelligence" for self-reported emotion-related traits (Hughes & Evans, 2018; Zeidner et al., 2008). The TEIQue divides trait EI into four sub-dimensions, each covering a number of Emotional Intelligence facets (Petrides, 2009):

1. *Emotionality* includes the facets of emotion perception, emotion expression, relationships, and trait empathy. Individuals with high scores on the Emotionality factor are not only highly aware of their own emotions but also skilled at recognizing and understanding the feelings of others. This emotional awareness enables them to develop and maintain stable and fulfilling relationships.
2. *Self-control* comprises the facets of stress management, impulse control, and emotion regulation. Individuals with high scores on the Self-control factor can effectively manage their impulses and regulate external pressures and stress.
3. *Sociability* encompasses the facets of emotion management, assertiveness, and social awareness. Unlike the Emotionality factor, the Sociability factor focuses more on social contexts in general rather than personal relationships. Individuals with high scores on the Sociability factor excel in social interactions, communicate confidently across various contexts, and are adept at negotiation and networking.
4. *Well-being* includes the facets of trait happiness, trait optimism, and self-esteem. Individuals with high scores on the Well-being factor generally tend to have a positive outlook on life, reflect positively on past experiences, and have optimistic expectations for the future, often experiencing positive, fulfilling emotions.

The TEIQue and TEIQue-SF have been extensively used in community samples (see Baudry et al., 2018, for a systematic review). Lower TEIQue-SF scores have been associated with higher symptoms of depression (Tolsa & Malas, 2022), anxiety (Siegling et al., 2015), as well as insomnia severity (Emert et al., 2017) in student and community samples. Further studies confirmed links with overall mental health (Martins et al., 2010). Evidence from clinical samples extends these findings, indicating that trait EI is a strong predictor of psychopathology and may influence mental health both directly and indirectly via related constructs such as mindfulness and irrational beliefs (Petrides et al., 2017).

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However, research investigating its sub-dimensions within clinical populations remains limited (Aslanidou et al., 2018; Oussi & Bouvet, 2023; Petrides et al., 2011; Sinclair & Feigenbaum, 2012). For example, Oussi and Bouvet (2023) investigated trait EI in individuals with panic disorder, generalized anxiety disorder, and non-clinical controls. They found that the clinical groups had significantly lower scores than the non-clinical group for the total TEIQue Score as well as for the sub-dimensions Well-being and Self-control. No significant difference was found between the two clinical groups. Aslanidou et al. (2018) compared TEIQue-SF subscale scores between individuals with a substance-related disorder and non-clinical individuals. Results showed that individuals with a substance-related disorder exhibited lower scores on all subscales except Emotionality.

In another study, Sinclair and Feigenbaum (2012) explored the TEIQue profiles of individuals with borderline personality disorder, finding significantly lower scores on all sub-dimensions compared to a non-clinical control group. Additionally, Petrides et al. (2011) compared the TEIQue profiles of individuals with and without autism spectrum disorder. The former scored significantly lower on all four sub-dimensions of the TEIQue. These findings give some indication that trait EI and its sub-dimensions may differ between clinical and non-clinical groups. However, given the small number of studies and disorders assessed, further research is needed. Furthermore, only one study to date has compared two clinical groups, both being anxiety disorders.

To extend previous research, this study examined whether individuals with depression, anxiety-related disorders, or insomnia differ from matched non-clinical controls in trait EI (TEIQue-SF). We assessed both the global score and all sub-scales (Emotionality, Self-control, Sociability, Well-being). We expected lower scores in all clinical groups compared to controls. Given their distinct clinical presentations, we also explored whether depression, anxiety, and insomnia differ in trait EI subdimensions.

Method

Participants

Participants with a mental disorder were drawn from baseline data of the ImPuls trial on exercise and mental health (Wolf et al., 2024). They were recruited between February 2021 and June 2022 via psychiatric hospitals, general practices, and outpatient clinics. Inclusion criteria were ICD-10 diagnoses of major depressive disorder (≥ moderate), nonorganic insomnia, panic disorder, agoraphobia, or post-traumatic stress disorder (PTSD); exclusion criteria included substance-related disorder, bipolar disorder, psychotic disorder, eating disorder, or acute suicidality. Participants had to be members of one of two cooperating health insurances.

Controls were recruited between November 2022 and September 2024 via flyers, social media, and other studies, and matched 1:1 on age (± 3 years), gender, and education.

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Individuals were eligible for inclusion in the control group if they did not meet any of the following diagnoses at the time of assessment: bipolar disorder (including those currently remitted), current depressive episode, remitted recurrent depressive disorder, dysthymia, agoraphobia, social anxiety disorder, panic disorder, generalized anxiety disorder, obsessive-compulsive disorder, PTSD, somatic symptom disorder, eating disorders, nonorganic insomnia, schizophrenia, schizotypal, and delusional disorders, currently remitted schizophrenia, persistent delusional disorder, or schizoaffective disorder, mental and behavioral disorders due to psychotropic substances, or hyperkinetic disorder.

For both groups, eligibility required age 18–65 years, fluency in German, and no regular exercise (more than once per week, with sessions lasting at least 30 minutes) for six consecutive weeks in the prior three months[1].

A total of 308 individuals with a depressive disorder (n = 200[2]), an anxiety-related disorder (agoraphobia and/or panic disorder and/or PTSD, n = 61) or insomnia (n = 47) were included. Non-clinical controls were matched 1:1 to the clinical participants. Final control group sizes were n = 196 for depression, n = 57 for anxiety-related disorders, and n = 47 for insomnia. A total of eight non-clinical controls (four depression and four anxiety-related disorders) could not be matched because of missing demographic information or because no suitable gender match was available (e.g., participants identifying outside the binary categories). If age, gender, or education data was missing in the clinical group, matching was based on the remaining variables. Demographic and clinical characteristics of all groups are presented in Table 1.

A power analysis using G*Power (Version 3.1.9.7; Faul et al., 2007), based on independent post-hoc t tests with Bonferroni correction, indicated that n = 50 per subgroup was required to detect a medium effect (d = 0.60) between clinical and control groups, assuming α (0.05/3) = 0.017 and power = 0.80. The actual subgroup size of the insomnia group was slightly smaller due to recruitment constraints of the parent study.

Measures

Structured Clinical Interview for DSM-5 – Clinician Version (SCID-5-CV)

The SCID-5-CV (First et al., 2016) was administered to establish inclusion and exclusion diagnoses. The SCID-5-CV is a semi-structured instrument to assess mental disorders according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013). The SCID-5-CV was extended with additional modules from the SCID-5 Research Version for somatic symptom and related disorders, specific phobia, sleep disorders, feeding and eating disorders, body dysmorphic disorders,

1) This was a relevant criterion for the ImPuls-study (Wolf et al., 2024).

2) In the preregistration, the number of patients with depression was mistakenly reported as 199. The correct sample size included in the study is 200.

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gambling disorder, and intermittent explosive disorder. The SCID-5-CV shows adequate psychometric properties, with a percentage of positive agreement between interview and clinical diagnoses between 73% and 97%, diagnostic sensitivity and specificity > .70 and Cohen's kappa > .70 for most diagnoses (Osório et al., 2019).

Demographic Questionnaire

A demographic questionnaire assessed age, gender, marital status, socioeconomic status, medication use, and history of inpatient or outpatient psychological treatment.

Trait Emotional Intelligence Questionnaire – Short Form (TEIQue-SF)

Trait EI was assessed with the 30-item short version of the TEIQue (TEIQue-SF; Petrides, 2009). Items are rated on a 7-point Likert scale (1 = completely disagree to 7 = completely agree), yielding a global score and four subscales: Well-being (6 items, e.g. "I feel that I have a number of good qualities."), Self-control (6 items, e.g., "I'm usually able to find ways to control my emotions when I want to."), Emotionality (8 items, e.g. "I find it difficult to bond well even with those close to me."), and Sociability (6 items, e.g. "I can deal effectively with people."). The TEIQue-SF shows good psychometric properties with an internal consistency for the global score of $\alpha = .89$ for men and $\alpha = .88$ for women (Cooper & Petrides, 2010). In this study, Cronbach's α of the global score was $\alpha = .85$ for the clinical sample, $\alpha = .87$ for the non-clinical sample and $\alpha = .92$ for the total sample. Cronbach's α for the subscales ranged between $\alpha = .60$ and $\alpha = .82$ for the clinical sample, between $\alpha = .54$ and $\alpha = .81$ for the non-clinical sample and between $\alpha = .69$ and $\alpha = .89$ for the total sample.

Symptom Questionnaires

Symptom severities were measured with validated self-report questionnaires: the *Brief Symptom Inventory* (BSI-18) for global, somatic, depressive, and anxiety symptoms; the *Patient Health Questionnaire-9* (PHQ-9) for depressive symptoms; the *Insomnia Severity Index* (ISI) for sleep difficulties, and the *Pittsburgh Sleep Quality Index* (PSQI) for sleep quality; the seven-item *Generalized Anxiety Disorder Scale* (GAD-7) for anxiety; the *PTSD Checklist for DSM*-5 (PCL-5) for PTSD, and the *Positive and Negative Affect Schedule* (PANAS). Validated German versions were used. All questionnaires show good internal consistency and sufficient test-retest reliability.

Procedure

Clinical participants first completed telephone screening for ImPuls eligibility, followed by written informed consent and a SCID-5-CV interview (face-to-face or video) conducted by trained master-level psychologists. Once eligible, they received a link to the online questionnaire battery, to be completed within 14 days. Compensation depended on group allocation in the parent ImPuls trial: those randomized to treatment as usual (control

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condition) received €450[3] after study completion. At baseline, no participants had yet been randomized.

Non-clinical controls provided consent, completed an online screening (age, gender, and education, exclusion criteria), and were interviewed with the SCID-5-CV by supervised graduate students via video. When individuals were not diagnosed with any of the mental disorders that would have led to their exclusion, they received a link to the same online survey as the clinical sample. Participants in the non-clinical control groups received a compensation of €8 per hour or course credit after completion of the assessment.

Data Analyses

Data were analyzed using two-way ANOVAs with group (clinical vs. control) and diagnosis (depression, anxiety-related disorder, insomnia) as factors, applied to the TEIQue-SF global and subscales. This deviated from the preregistered one-way ANOVAs but better aligned with the study hypotheses.

Post-hoc comparisons were conducted using independent-samples *t* tests with Bonferroni correction for six pairwise comparisons per outcome. Nonparametric Wilcoxon–Mann–Whitney tests were additionally conducted as sensitivity analyses, as assumption checks indicated that assumptions underlying parametric tests were not consistently met, including indications of heterogeneity of variances and some deviations from normality (see Supplementary Table S2). The Wilcoxon tests were conducted separately in each imputed dataset using a normal approximation with corrections for ties and continuity. Squared standardized test statistics were combined across imputations using the D_2 method (Li et al., 1991), and the resulting *p*-values were Bonferroni-adjusted.

Exploratory analyses examined differences between the three clinical groups. Additional analyses adjusted separately for age and gender. Missing data were handled via multiple imputation (10 datasets, MICE, Version 3.16.0; van Buuren & Groothuis-Oudshoorn, 2011), separately for clinical and control samples. Estimates and their sampling variances from the independent-samples t tests and covariate-adjusted linear models were pooled using Rubin's rules, with degrees of freedom calculated using the Barnard–Rubin adjustment (Barnard & Rubin, 1999). Missingness was minimal (≤ 1.3% per variable). Demographic and clinical descriptive statistics are reported for the original data, whereas descriptive statistics and inferential analyses of the TEIQue-SF outcomes are based on the imputed datasets. Analyses were conducted in R (Version 4.4.1; R

3) The assessments conducted in the parent ImPuls-study (Wolf et al., 2024) were intensive and involved multiple phases, including wearing accelerometer-based sensors to monitor participants' activity patterns. Additionally, the final assessment took place twelve months after the initial one, requiring a considerable commitment of time and effort from the participants.

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Core Team, 2024), with a significance threshold of $p < .05$ after adjustment for multiple comparisons where applicable.

Results

Subject Characteristics

Sociodemographic and clinical characteristics are summarized in Table 1. Compared to their matched controls, the depression and anxiety-related disorders groups had significantly lower employment rates; the depression group also reported significantly less physical activity. All clinical groups differed significantly from their controls on the clinical measures; the only exception was prior inpatient psychotherapy, which did not differ between the insomnia group and its control.

Group Differences in Trait Emotional Intelligence

As shown in Table 2, all clinical groups scored significantly lower than controls on the TEIQue-SF global score and subscales. Significant main effects of Group (clinical vs. non-clinical control) were observed for the TEIQue-SF global score and all subscales. Additionally, a significant main effect of the assigned type of Diagnosis (whether depression, anxiety-related disorder or insomnia) was found for the TEIQue-SF global score and all subscales, except Sociability. Interaction effects between Group and Diagnosis were significant for the TEIQue-SF global score and the Well-being subscale, but not for the other subscales. Detailed ANOVA results can be found in Table S1 (see Supplementary Materials). In the additional covariate-adjusted analyses, the main effect of Diagnosis on Emotionality was no longer statistically significant after adjustment for gender ($p = .141$).

Post-hoc tests indicated that depression scored lower than insomnia on the global score, Well-being and Self-control, and anxiety-related disorders scored lower than insomnia on Self-control. The latter difference was no longer statistically significant when controlling for age, $t(102.78) = -2.17$, $p = .192$. The pattern of statistical significance in all other between-clinical-group pairwise comparisons remained unchanged in the separate age- and gender-adjusted models. No further differences were observed among clinical groups (see Table 3). The rank-based sensitivity analyses yielded the same pattern of statistically significant group differences as the parametric comparisons at the .05 level after Bonferroni adjustment (see Supplementary Table S2).

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Table 1

Demographic and Clinical Characteristics of the Clinical Groups and Their Respective Matched Control Groups

Characteristic	Depression			Anxiety-Related Disorders			Insomnia		
	Clinical Group *n* = 200	Control Group *n* = 196	Differences	Clinical Group *n* = 61	Control Group *n* = 57	Differences	Clinical Group *n* = 47	Control Group *n* = 47	Differences
	n (%)	*n* (%)	Chi-squared-/ Fisher's exact test (*p*)	*n* (%)	*n* (%)	Chi-squared-/ Fisher's exact test (*p*)	*n* (%)	*n* (%)	Chi-squared-/ Fisher's exact test (*p*)
Gender[a]			.620			.199			1.00
Women	131 (65.5)	130 (66.3)		45 (73.8)	45 (78.9)		36 (76.6)	36 (76.6)	
Men	67 (33.5)	66 (33.7)		12 (19.7)	12 (21.1)		11 (23.4)	11 (23.4)	
Other	2 (1.0)	0 (0.0)		4 (6.6)	0 (0.0)		0 (0.0)	0 (0.0)	
Nationality[b]			.087			.610			.267
German	185	169		58	56		44	41	
Other	21	30		4	3		3[c]	6	
Native language[b]			.860			.587			.063
German	180	174		55	54		46	40	
Other	25[d]	28		9	5		4	8	
Employment[e]			**< .001**			**.005**			.431
Unemployed	**64 (32.0)**	**27 (13.8)**		**23 (37.7)**	**7 (12.3)**		10 (21.3)	10 (21.3)	
Employed	**115 (57.5)**	**157 (80.1)**		**31 (50.8)**	**41 (71.9)**		32 (68.1)	36 (76.6)	
Other	**19 (9.5)**	**12 (6.1)**		**6 (9.8)**	**9 (15.8)**		4 (8.5)	1 (2.1)	
Relationship status[e]			.064			.354			.212
Single	96 (48.0)	75 (38.3)		28 (45.9)	32 (56.1)		24 (51.1)	17 (36.2)	
In a relationship	104 (52.0)	121 (61.7)		33 (54.1)	25 (43.9)		23 (48.9)	30 (63.8)	
Years of education[f]			.958			.951			1.00
≤ 10 Years	39 (19.5)	36 (18.4)		19 (31.1)	18 (31.6)		17 (36.2)	17 (36.2)	
11-13 Years	79 (39.5)	79 (40.3)		23 (37.7)	20 (35.1)		17 (36.2)	17 (36.2)	
> 13 Years	82 (41.0)	81 (41.3)		19 (31.1)	19 (33.3)		13 (27.6)	13 (27.6)	
Previous psychological treatment									
Previous outpatient treatment	**128 (64.3)**[d]	**27 (13.8)**	**< .001**	**55 (91.7)**[g]	**8 (14.0)**	**< .001**	**31 (66.0)**	**9 (19.1)**	**< .001**
Previous inpatient treatment	**97 (48.5)**	**2 (1.0)**	**< .001**	**36 (59.0)**	**6 (10.5)**	**< .001**	7 (14.9)	1 (2.1)	.059
Current treatment									
Psychological treatment[h]	**96 (64.9)**[i]	**0 (0.0)**	**< .001**	**42 (75.0)**[j]	**0 (0.0)**	**< .001**	**20 (60.6)**[k]	**0 (0.0)**	**< .001**
Pharmacological treatment	**116 (58.3)**[d]	**4 (2.0)**	**< .001**	**29 (47.5)**	**1 (1.8)**	**< .001**	**19 (40.4)**	**1 (2.1)**	**< .001**

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Characteristic	Depression			Anxiety-Related Disorders			Insomnia		
	Clinical Group n = 200	Control Group n = 196	Differences	Clinical Group n = 61	Control Group n = 57	Differences	Clinical Group n = 47	Control Group n = 47	Differences
	M (SD)	M (SD)	Wilcoxon rank-sum test	M (SD)	M (SD)	Wilcoxon rank-sum test	M (SD)	M (SD)	Wilcoxon rank-sum test
Age	41.0 (12.7)[l]	40.2 (13.8)	W = 20119, p = .527	39.8 (12.7)	39.2 (13.1)	W = 1795.5, p = .761	48.8 (12.0)[m]	48.2 (13.1)	W = 1064, p = .963
Physical activity (minutes/week), self-report (BSA-F)	**303.2 (490.4)[n]**	**545.8 (877.7)[o]**	**W = 12980, p < .001**	519.5 (841.5)[p]	546.1 (669.4)	W = 1641, p = .709	454.75 (384.5)[m]	431.1 (537.6)	W = 1207, p = .243
Global symptom severity (BSI-18)	**21.4 (10.1)**	**3.4 (4.6)**	**W = 37937, p < .001**	**19.3 (9.5)**	**3.1 (4.4)**	**W = 3297, p < .001**	**16.6 (10.0)**	**2.7 (3.0)**	**W = 2041, p < .001**
Sleep quality (PSQI)	**9.4 (3.7)[q]**	**4.2 (2.5)[r]**	**W = 33166, p < .001**	**8.4 (4.2)[s]**	**5.0 (3.2)**	**W = 2377, p < .001**	**11.5 (2.8)[c]**	**4.1 (2.4)**	**W = 2108.5, p < .001**
Depressive symptoms (PHQ-9)	**14.2 (4.5)**	**2.8 (3.1)[r]**	**W = 38030, p < .001**	**10.2 (5.3)[g]**	**3.1 (3.6)**	**W = 3055.5, p < .001**	**12.1 (4.3)**	**2.2 (2.0)**	**W = 2187, p < .001**
Anxiety symptoms (GAD-7)	**10.2 (4.7)**	**2.0 (2.2)[r]**	**W = 36928, p < .001**	**10.2 (4.9)**	**2.0 (2.3)**	**W = 3307.5, p < .001**	**8.8 (4.8)**	**1.6 (1.6)**	**W = 2088, p < .001**
PTSD symptoms (PCL-5)	**26.4 (13.9)[d]**	**3.4 (5.4)[r]**	**W = 36938, p < .001**	**26.9 (16.4)**	**3.8 (4.5)**	**W = 3166, p < .001**	**25.5 (13.9)**	**2.6 (2.9)**	**W = 2139, p < .001**
Positive affect (PANAS)	**2.1 (0.6)[t]**	**3.4 (0.6)**	**W = 2727, p < .001**	**2.5 (0.6)**	**3.2 (0.6)**	**$t(116) = 6.8$, p < .001[u]**	**2.4 (0.6)**	**3.3 (0.6)**	**$t(92) = 7.5$, p < .001[u]**
Negative affect (PANAS)	**2.7 (0.7)[d]**	**1.4 (0.5)**	**W = 36363, p < .001**	**2.6 (0.8)[g]**	**1.3 (0.3)**	**W = 3231.5, p < .001**	**2.2 (0.8)[c]**	**1.3 (0.3)**	**W = 1923, p < .001**

Note. BSA-F = Physical Activity, Exercise, and Sport Questionnaire; BSI-18 = Brief Symptom Inventory; PSQI = Pittsburgh Sleep Quality Index; PHQ-9 = Patient Health Questionnaire-9; GAD-7 = Generalized Anxiety Disorder Scale; PCL-5 = PTSD Checklist for DSM-5; TEIQue-SF = Trait Emotional Intelligence Questionnaire – Short Form; PANAS = Positive and Negative Affect Schedule; statistically significant p-values (p < .05) are highlighted in bold.

[a]four participants in the non-clinical control group indicated a different gender during screening compared to a later questionnaire. However, through email correspondence and personal interviews, the correct gender was confirmed in all cases. [b]multiple responses possible; [c]based on 46 participants; [d]based on 199 participants; [e]The original response options have been collapsed into the presented categories; [f]15 participants of the non-clinical control group provided contradictory information at a later date; [g]based on 60 participants; [h]an error in the questionnaire regarding current psychological treatment has resulted in a high number of missing responses in the clinical group; [i]based on 148 participants; [j]based on 56 participants; [k]based on 33 participants; [l]based on 198 participants; [m]based on 45 participants; [n]based on 189 participants; [o]based on 195 participants; [p]based on 59 participants; [q]based on 193 participants; [r]based on 195 participants; [s]based on 56 participants; [t]based on 197 participants; [u]t-test.

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Table 2

Means, Standard Deviations, and Pairwise Comparisons for TEIQue-SF Subscales and Global Scores Across Clinical and Control Groups

Variable	Disorder	Clinical *M* (*SD*)	Control *M* (*SD*)	*t*	*p*	*d*	95% CI for *d*
Well-Being	**Depression**	**3.69 (1.14)**	**5.81 (.90)**	***t*(385.36) = -20.42**	**< .001**	**-2.06**	**[-2.31, -1.82]**
	Anxiety-Related	**4.11 (1.19)**	**5.69 (.91)**	***t*(114.05) = -8.06**	**< .001**	**-1.49**	**[-1.90, -1.07]**
	Insomnia	**4.61 (1.38)**	**5.94 (.83)**	***t*(89.90) = -5.66**	**< .001**	**-1.17**	**[-1.61, -0.72]**
Self-Control	**Depression**	**3.95 (.97)**	**5.27 (.91)**	***t*(390.82) = -13.96**	**< .001**	**-1.41**	**[-1.63, -1.18]**
	Anxiety-Related	**3.87 (1.01)**	**5.29 (.87)**	***t*(114.05) = -8.11**	**< .001**	**-1.49**	**[-1.91, -1.08]**
	Insomnia	**4.47 (1.04)**	**5.44 (.86)**	***t*(89.96) = -4.90**	**< .001**	**-1.01**	**[-1.45, -0.58]**
Emotionality	**Depression**	**4.42 (1.05)**	**5.40 (.81)**	***t*(381.04) = -10.34**	**< .001**	**-1.05**	**[-1.26, -0.84]**
	Anxiety-Related	**4.69 (1.01)**	**5.44 (.77)**	***t*(114.05) = -4.52**	**< .001**	**-0.83**	**[-1.21, -0.45]**
	Insomnia	**4.76 (.99)**	**5.53 (.76)**	***t*(90.06) = -4.23**	**< .001**	**-0.87**	**[-1.30, -0.44]**
Sociability	**Depression**	**3.89 (1.01)**	**4.96 (.84)**	***t*(388.97) = -11.44**	**< .001**	**-1.15**	**[-1.37, -0.94]**
	Anxiety-Related	**4.05 (1.01)**	**5.01 (.82)**	***t*(114.05) = -5.67**	**< .001**	**-1.04**	**[-1.43, -0.65]**
	Insomnia	**4.13 (1.14)**	**5.15 (.74)**	***t*(90.06) = -5.18**	**< .001**	**-1.07**	**[-1.51, -0.63]**
Global Score	**Depression**	**3.96 (.71)**	**5.40 (.66)**	***t*(385.14) = -20.62**	**< .001**	**-2.08**	**[-2.33, -1.84]**
	Anxiety-Related	**4.18 (.71)**	**5.37 (.59)**	***t*(114.05) = -9.77**	**< .001**	**-1.80**	**[-2.23, -1.37]**
	Insomnia	**4.48 (.89)**	**5.54 (.59)**	***t*(90.06) = -6.79**	**< .001**	**-1.40**	**[-1.86, -0.94]**

Note. TEIQue-SF = Trait Emotional Intelligence Questionnaire – Short Form. Descriptive statistics are based on the imputed datasets. Degrees of freedom were calculated using the Barnard-Rubin adjustment. Reported *p*-values are Bonferroni-adjusted for six comparisons per outcome. Confidence intervals refer to Cohen's *d*, are based on approximate Wald intervals pooled across imputations, and are not adjusted for multiple comparisons. Statistically significant *p*-values ($p < .05$) are highlighted in bold.

Table 3

Results of Pairwise Comparisons for TEIQue-SF Subscales and Global Score Across Clinical Groups

Variable	Comparison	*t*	*p*	*d*	95% CI for *d*
Well-Being	Depression vs. Anxiety-Related	*t*(256.44) = -2.54	.069	-0.37	[-0.66, -0.08]
	Depression vs. Insomnia	***t*(242.15) = -4.80**	**< .001**	**-0.78**	**[-1.11, -0.45]**
	Anxiety-Related vs. Insomnia	*t*(103.88) = -2.00	.290	-0.39	[-0.78, 0.00]
Self-Control	Depression vs. Anxiety-Related	*t*(256.64) = 0.51	1.00	0.07	[-0.21, 0.36]
	Depression vs. Insomnia	***t*(241.97) = -3.29**	**.007**	**-0.53**	**[-0.86, -0.21]**
	Anxiety-Related vs. Insomnia	***t*(103.94) = -3.02**	**.019**	**-0.59**	**[-0.98, -0.19]**
Emotionality	Depression vs. Anxiety-Related	*t*(256.21) = -1.78	.457	-0.26	[-0.55, 0.03]
	Depression vs. Insomnia	*t*(242.40) = -2.02	.266	-0.33	[-0.65, -0.01]
	Anxiety-Related vs. Insomnia	*t*(104.06) = -0.36	1.00	-0.07	[-0.45, 0.32]
Sociability	Depression vs. Anxiety-Related	*t*(256.39) = -1.08	1.00	-0.16	[-0.45, 0.13]
	Depression vs. Insomnia	*t*(242.57) = -1.43	.921	-0.23	[-0.55, 0.09]
	Anxiety-Related vs. Insomnia	*t*(104.06) = -0.39	1.00	-0.08	[-0.46, 0.31]

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Variable	Comparison	*t*	*p*	*d*	95% CI for *d*
Global Score	Depression vs. Anxiety-Related	*t*(256.17) = -2.13	.203	-0.31	[-0.60, -0.02]
	Depression vs. Insomnia	***t*(242.45) = -4.28**	**< .001**	**-0.69**	**[-1.02, -0.37]**
	Anxiety-Related vs. Insomnia	*t*(104.06) = -1.93	.340	-0.37	[-0.76, 0.01]

Note. TEIQue-SF = Trait Emotional Intelligence Questionnaire – Short Form. Degrees of freedom were calculated using the Barnard-Rubin adjustment. Reported *p*-values are Bonferroni-adjusted for six comparisons per outcome. Confidence intervals refer to Cohen's *d*, are based on approximate Wald intervals pooled across imputations, and are not adjusted for multiple comparisons. Statistically significant *p*-values ($p < .05$) are highlighted in bold.

Discussion

This study compared trait EI in individuals with depression, anxiety-related disorders, and insomnia to matched controls. As expected, all clinical groups scored significantly lower on the TEIQue-SF global score and all subscales, consistent with results from prior studies in community samples, which have also linked higher trait EI to better mental health (Martins et al., 2010). Our results extend findings from clinical samples with autism and borderline personality disorder, which have also found lower scores in clinical compared to non-clinical groups (Petrides et al., 2011; Sinclair & Feigenbaum, 2012).

Our results partly diverged from Aslanidou et al. (2018), who reported intact Emotionality in substance-related disorder. This underscores that different disorders may present different competencies in EI related to their clinical characteristics. Indeed, emotional deficits in substance-related disorder populations are associated with difficulties in awareness, expression, and regulation of emotions (Dingle et al., 2018), but not necessarily to lower Emotionality scores, which also reflect empathy and relational skills. In contrast, the clinical groups in the current study may experience more generalized deficits in emotional competencies, which could account for the broader impairments observed here.

When comparing our results to the only previous study including anxiety-related disorders, further differences emerge. Oussi and Bouvet (2023) found that individuals with generalized anxiety disorder and panic disorder scored lower than controls only on Well-being and Self-control, but not on Emotionality or Sociability. Several methodological differences might account for this discrepancy. Their non-clinical controls self-declared the absence of mental disorders, whereas we used structured clinical interviews and 1:1 demographic matching (gender, age, education), which likely increased sensitivity and may have revealed deficits not detected in their sample. Differences in clinical composition may also matter: while their study focused narrowly on generalized anxiety and panic disorder, our broader anxiety group also included agoraphobia and PTSD, potentially capturing additional emotional and interpersonal difficulties. Both disorders are characterized by high avoidance and heightened reactivity to threat cues, which

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may be related differently to trait EI compared to generalized anxiety or panic disorder. For instance, reduced emotional awareness or expression (facets of Emotionality) and avoidance-related interpersonal difficulties (Sociability) could indicate broader deficits in emotional competencies.

At the same time, the heterogeneity of our anxiety-related disorders group should be considered when interpreting these findings. The included conditions represent a broader spectrum of anxiety-related psychopathology, which allowed us to capture a wider range of clinical presentations, but may also differ in specific symptom profiles and emotion regulation processes. For example, prior studies comparing panic disorder and generalized anxiety disorder suggest partly divergent patterns: Onur et al. (2013) found lower total emotional intelligence in generalized anxiety disorder, but not in panic disorder, compared to non-clinical controls, whereas Lizeretti et al. (2014) reported broadly reduced emotional understanding and regulation in anxiety disorders but no significant EI differences between panic disorder with agoraphobia and generalized anxiety disorder. In addition, research on PTSD comorbidity indicates that emotion dysregulation domains such as limited regulation strategies, impulse control difficulties, lack of emotional awareness, and lack of emotional clarity may differ across trauma- and anxiety-related presentations (Allbaugh et al., 2025). This heterogeneity may have reduced the sensitivity to detect more fine-grained disorder-specific differences in trait EI, potentially contributing to the largely non-significant differences observed between clinical groups. Together, our findings highlight the importance of methodologically rigorous disorder-specific investigations of trait EI, to advance a nuanced understanding across clinical populations.

Beyond overall deficits, comparisons between clinical groups revealed disorder-specific patterns in emotional competencies. Individuals with insomnia showed less pronounced impairments on Well-being and Self-control, and global trait EI especially compared to those with depression. On Well-being, they scored significantly higher than the depression group. Well-being, which captures positive affect, life satisfaction, and a positive outlook on life, is closely intertwined with depressive symptomatology, where diminished life satisfaction and reduced positive affect are core features. In contrast, Well-being impairments in insomnia appeared less pronounced, but it remains unclear whether this reflects disorder-specific characteristics, consequences of the disorders, or predisposing differences in trait EI. For the Self-control subscale, individuals with insomnia scored higher than those with depression or anxiety-related disorders. Self-control, reflecting the ability to regulate emotions and behaviors effectively, is often impaired in depression and anxiety. Maladaptive strategies such as rumination, characterized by repetitive focus on negative emotions (McLaughlin & Nolen-Hoeksema, 2011), may both reflect underlying deficits in adaptive regulation and contribute to their maintenance. Thus, lower Self-control scores could indicate a cycle in which limited regulatory capacity increases the use of maladaptive strategies, which in turn exacerbate symptoms.

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Additionally, depression and anxiety disorders are related to heightened emotional reactivity, which may overwhelm regulatory capacities, further contributing to deficits in Self-control (Ripper et al., 2018). Thus, reduced Self-control in depression and anxiety may reflect both difficulties in applying adaptive regulation strategies and the additional burden of stronger emotional reactivity.

Interestingly, the difference in Self-control between the anxiety and insomnia groups was no longer significant after controlling for age. This may suggest that the effect may have been partly driven by age rather than disorder-specific factors. However, as insomnia is more prevalent in older adults (Klimt et al., 2023), age may also be considered part of the disorder's typical profile rather than a mere confound. Alternatively, insomnia may involve less severe Self-control deficits than anxiety-related disorders. Evidence regarding the effect of poor sleep on emotion regulation is mixed: some studies report general associations (Perez et al., 2022), whereas others find difficulties only under specific conditions, such as medication use (Minkel et al., 2012). Future research should investigate whether these differences reflect disorder-specific traits or compensatory Self-control mechanisms in insomnia that may lessen more severe deficits observed in other clinical populations. The relationship between Self-control and clinical conditions could be complex and bidirectional: low Self-control may increase vulnerability to depression, anxiety, or insomnia, while chronic symptoms may further erode Self-control capacities. Similarly, the comparatively higher Well-being scores in the insomnia group also warrant further study. Future research should assess the directionality of the effects – or whether well-being is a mere epiphenomenon of mental disorders, especially depression.

Several limitations should be acknowledged. First, the cross-sectional design precludes causal interpretations. Longitudinal studies are needed to determine whether reduced trait EI is a cause or consequence of psychopathology. Second, reliance on self-report measures may introduce bias, and future research could benefit from incorporating multi-method approaches (e.g., behavioral assessments, informant reports). Third, whereas clinical group sizes were sufficient for detecting group-control differences, they may have limited power to detect smaller between-disorder effects. Fourth, the TEIQue-SF, although efficient and reliable, does not capture individual facets within the four factors. This lack of granularity may obscure specific emotional deficits (e.g., empathy, emotion regulation). In addition, the full version typically shows higher internal consistency (Petrides, 2009) and may therefore offer a more precise assessment of the underlying dimensions, potentially allowing for the detection of more subtle differences between clinical groups. Furthermore, the anxiety-related disorders group was diagnostically heterogeneous, which may have limited the detection of disorder-specific differences in trait EI. Finally, although trait EI is conceptualized as a personality-based construct rather than a form of cognitive ability, we did not include additional measures of related individual difference variables, such as general intelligence or social competence. Therefore,

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the specificity of the observed associations cannot be fully determined, as some overlap with other cognitive or socio-emotional constructs cannot be ruled out. Future research should include a broader range of measures to further disentangle trait EI from related domains.

In conclusion, this study underscores the relevance of trait EI across clinical populations. All groups showed marked deficits, with disorder-specific patterns most evident in depression (lower Well-being and Self-control). These findings suggest disorder-specific differences in trait EI. Future studies should assess whether impairments in trait EI are a risk factor, maintaining factor, consequence or an epiphenomenon of mental disorders. If they were found to be a risk or maintaining factor, future studies should further examine mechanisms and treatment implications.

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

Ethics Statement: This study was approved by the ethics committee for medical research at the University of Tübingen (ID: 888/2020B01), and all procedures performed were in accordance with the ethical standards of the committee and with the 1964 Helsinki declaration and its later amendments.

Author Note: A version of the study reported in this article was included as Study I in the first author's doctoral dissertation (Herzog, 2025).

Preregistration: The study was preregistered at OSF (https://osf.io/ujm9s).

Reporting Guidelines: The reporting of this study followed the APA Journal Article Reporting Standards for Quantitative Research (JARS–Quant) for nonexperimental studies.

Social Media Accounts: *Eva Herzog:* LinkedIn, *Celina L. Müller:* LinkedIn

Data Availability: Data and analysis code are openly available at OSF (https://osf.io/5rcuz).

Supplementary Materials

The Supplementary Materials contain the following items:

- Preregistration (Herzog et al., 2022S)
- Research data and analysis code (Wolf et al., 2026S)
- Supplementary tables (Herzog et al., 2026S):

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- Table S1. ANOVA results for TEIQue-SF subscales and global score
- Table S2. Nonparametric results of pairwise comparisons for TEIQue-SF subscales and global score across groups

Index of Supplementary Materials

Herzog, E., Ehring, T., Cludius, B., Takano, K., & Studnitz, T. (2022S). *Associations between trait emotional intelligence and depression, insomnia and anxiety disorders – Focusing on subdimensions* [Preregistration]. OSF Registries. https://osf.io/ujm9s

Wolf, S., Seiffer, B., Frei, A. K., Herzog, E., Fiedler, D. V., Ehring, T., Sudeck, G., & Studnitz, T. (2026S). *Efficacy and cost effectiveness of the implementation of a supervised, transdiagnostic group-based exercise intervention named ImPuls for patients with major depression, panic disorder, agoraphobia, post-traumatic stress disorder and nonorganic insomnia within a naturalistic outpatient setting in Germany: A pragmatic RCT* [Research data and analysis code]. OSF. https://osf.io/5rcuz

Herzog, E., Wolf, S., Studnitz, T., Frei, A. K., Seiffer, B., Welkerling, J., Zeibig, J., Sudeck, G., Müller, C. L., Günak, M. M., Nakagawa, T. T., Ehring, T., Peters, S., Flagmeier, A. L., Zwanzleitner, L., Ramos-Murguialday, A., Takano, K., & Cludius, B. (2026S). *Supplementary materials to "Divergent profiles of trait emotional intelligence in depression, anxiety, and insomnia"* [Supplementary tables]. PsychOpen GOLD. https://doi.org/10.23668/psycharchives.22764

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