EUROPEAN JOURNAL OF
PSYCHO-
TRAUMATOLOGY
THE OFFICIAL JOURNAL OF THE EUROPEAN SOCIETY FOR TRAUMATIC STRESS STUDIES

Taylor & Francis
Taylor & Francis Group

CLINICAL RESEARCH ARTICLE

🔓 OPEN ACCESS ⟳ Check for updates

Experiences with a guided trauma-focused internet- and mobile-based intervention: a qualitative study of youth's perspectives

Christina Schulte [a], Cedric Sachser[b,c,d], Rita Rosner[e], David Daniel Ebert[a] and Anna-Carlotta Zarski [a,f]

aSchool of Medicine and Health, Professorship Psychology and Digital Mental Health Care, Technical University of Munich, Munich, Germany; bDepartment of Psychology, Professorship Clinical Child and Adolescent Psychology, University of Bamberg, Bamberg, Germany; cDepartment of Child and Adolescent Psychiatry/ Psychotherapy, Ulm University, Ulm, Germany; dGerman Center for Mental Health (DZPG), partner Site Ulm, Ulm, Germany; eDepartment of Psychology, Catholic University Eichstaett-Ingolstadt, Eichstätt, Germany; fDepartment of Clinical Psychology, Division of eHealth in Clinical Psychology, Philipps University of Marburg, Marburg, Germany

ABSTRACT

Introduction: Research on internet-interventions for youth with post-traumatic stress symptoms (PTSS) is limited, despite promising results in adults. A non-randomised feasibility study of a therapist-guided trauma-focused internet- and mobile-based intervention (IMI) showed potential in reducing PTSS but revealed challenges with adherence and individual fit. Insights from qualitative studies can enhance intervention quality by addressing personal needs. This study explores participants' views on the feasibility of a therapist-guided trauma-focused IMI to improve digital trauma interventions.

Methods: Semi-structured interviews based on theoretical models of acceptance and human support in IMIs were conducted with 17 of 32 participants from a self-help-based trauma-focused IMI with therapist guidance. Audio-recorded interviews were transcribed and analyzed using deductive-inductive content analysis. Independent coding resulted in good agreement (κ = .76).

Results: 20 themes were identified and organised under nine dimensions: participation motivation and expectations; recruitment process; treatment adherence and everyday use of therapeutic exercises; trauma processing; non-trauma processing intervention components; technology, structure, and design of the IMI; human support; individual fit; and active factors and efficacy. The technology, structure, and design of the IMI and other non-trauma-focused components were rated positively. Trauma processing presented challenges for many but was still perceived as a helpful and relevant active factor. Some felt a lack of therapeutic support, and greater personalisation of guidance was a frequent suggestion for improving the individual fit. The IMI's efficacy was most often perceived in its effects on improved coping with trauma and symptoms.

Discussion: The study identified key themes for the feasibility of a trauma-focused IMI for youth, showing general acceptance of its design, structure, and technology. While trauma processing in IMIs poses challenges similar to face-to-face therapy, these can be addressed by clarifying the therapy rationale, making trauma processing an important active factor. Further research is needed to improve individualisation and therapeutic support intensity.

Trial registration: German Clinical Trials Register identifier: DRKS00023341..

HIGHLIGHTS
- Youths' perspectives on taking part in a feasibility study evaluating a digital trauma-focused intervention are examined.
- The digital trauma-focused intervention was generally accepted in terms of design and content.
- Youth highlighted various themes for improving the intervention including the level of guidance and the degree of personalisation.

Experiencias con una intervención guiada por Internet y móvil centrada en el trauma: un estudio cualitativo de las perspectivas de los jóvenes

Introducción: La investigación sobre intervenciones en Internet para jóvenes con síntomas de estrés postraumático (PTSS por sus siglas en inglés) es limitada, a pesar de los prometedores resultados en adultos. Un estudio de viabilidad no aleatorizado de una intervención basada en Internet y móvil (IMI, por sus siglas en inglés) centrada en el trauma y guiada por un terapeuta mostró potencial para reducir el PTSS, pero reveló dificultades con la adherencia y la adaptación individual. Las reflexiones de los estudios cualitativos pueden mejorar la calidad de la intervención al abordar las necesidades personales. Este estudio explora las opiniones de los participantes sobre la viabilidad de una IMI guiada por un terapeuta y centrada en el trauma para mejorar las intervenciones digitales en el trauma.

Métodos: Se realizaron entrevistas semiestructuradas basadas en modelos teóricos de aceptación y apoyo humano en IMIs con 17 de 32 participantes de una IMI basada en la autoayuda y centrada en el trauma con orientación de terapeutas. Las entrevistas grabadas en audio fueron transcritas y analizadas usando análisis de contenido deductivo-inductivo. La codificación independiente resultó en una buena concordancia (κ = .76).

Resultados: Se identificaron 20 temas organizados en nueve dimensiones: motivación y expectativas de participación; proceso de reclutamiento; adherencia al tratamiento y uso cotidiano de los ejercicios terapéuticos; procesamiento del trauma; componentes de la intervención no centrados en el trauma; tecnología, estructura y diseño de la IMI; apoyo humano; adaptación individual; y factores activos y eficacia. La tecnología, la estructura y el diseño del IMI y otros componentes no centrados en el trauma fueron valorados positivamente. El procesamiento del trauma presentó desafíos para muchos, pero aún así se percibió como un factor activo útil y relevante. Algunos sintieron una falta de apoyo terapéutico, y una mayor personalización de la orientación fue una sugerencia frecuente para mejorar la adaptación individual. La eficacia de la IMI se percibió con mayor frecuencia en sus efectos sobre la mejora del afrontamiento del trauma y los síntomas.
Discusión: El estudio identificó temas clave para la viabilidad de una IMI centrada en el trauma para jóvenes, mostrando una aceptación general de su diseño, estructura y tecnología. Aunque el procesamiento del trauma en las IMI plantea desafíos similares a los de la terapia presencial, éstos pueden abordarse aclarando la justificación de la terapia, haciendo del procesamiento del trauma un importante factor activo. Se necesita más investigación para mejorar la individualización y la intensidad del apoyo terapéutico.

Abbreviations: APOI: Attitudes Towards Psychological Online Interventions Questionnaire; **CATS-2:** Child and Adolescent Trauma Screen for *DSM-5*; **COREQ:** Consolidated criteria for reporting qualitative research criteria; **CSQ-I:** Client Satisfaction Questionnaire in its version adapted for Internet interventions (**CSQ-I**); **IMI:** Internet-and mobile-based intervention; **i-CBT:** Internet-based cognitive behavioural therapy; **i-tf-CBT:** Trauma-focused internet-based cognitive behavioural therapy; **PTE-checklist:** 15-item screen for exposure to potentially traumatic events of the CATS-2; **PTSD:** Post-traumatic stress disorder; **PTSS:** Post-traumatic stress symptoms; **RCT:** Randomised controlled trial

1. Theoretical background

In adults, internet-delivered cognitive behavioural therapy (i-CBT) has been shown to effectively reduce symptoms of post-traumatic stress disorder (PTSD; Kuester et al., 2016; Lewis et al., 2019; Siddaway et al., 2022), with preliminary evidence suggesting that trauma-focused i-CBT (i-tf-CBT) can be superior to non-trauma-focused interventions (Ehlers et al., 2023). I-CBT for PTSD is a self-administered internet-based intervention with written or electronic content based on trauma-focused cognitive behavioural therapy. When working through the online material, individuals are supported by a therapist via chat, e-mail, telephone call or in face-to-face sessions. However, research on i-CBT for youth with post-traumatic stress symptoms (PTSS) is scarce, with only six studies evaluating internet-based interventions for youth exposed to traumatic events (Schulte, Harrer, et al., 2024). Notably, none of these studies evaluated a trauma-focused intervention, despite trauma-focused psychotherapy being recommended as first-line treatment for children and adolescents (ISTSS Guidelines Committee, 2019; Phelps et al., 2022; Rosner, Gutermann, et al., 2020).

To address this research gap, a proof-of-concept non-randomised feasibility study on a trauma-focused Internet- and mobile-based intervention (IMI) with therapist guidance was conducted on 32 youth with clinically significant PTSS (Schulte, Sachser, et al., 2024). Results of its preliminary efficacy suggested that the IMI can significantly reduce PTSS and symptoms of depression, as well as improve health-related quality of life at post-treatment and follow-up compared to baseline, with moderate

to large effect sizes ($d = 0.47–0.88$). Additionally, the IMI was found to be useful and understandable, with one-third of the sample showing reliable within-person improvement in PTSS from pre- to post-treatment. However, only one-third of participants completed the core sessions of the IMI with approximately one-third stopping before or within the trauma processing phase of treatment (Schulte, Sachser, et al., 2024). To improve the intervention and understand influential factors on adherence and efficacy, deeper insights into participants' perceptions and engagement with IMIs are needed.

Incorporating theoretical models in qualitative content analysis is beneficial as they provide structured theoretical frameworks that guide the interpretation of complex data. These models help identify and organise key themes, ensuring that the analysis captures the different dimensions of participants' experiences. The acceptability model for healthcare interventions (Sekhon et al., 2017) provides a thorough framework for understanding how people evaluate healthcare interventions. It considers both anticipated and actual cognitive and emotional responses to the interventions. Besides, it includes aspects like coherence of the intervention, perceived burden, and perceived effect. Moreover, the Efficiency Model of Support focus on the role of human support within IMIs, particularly how the combination of self-guided engagement and human guidance can impact the intervention's efficacy and suitability for individual needs (Schueller et al., 2017).

Little work has been done to understand how youth experience trauma-focused interventions (Salloum, 2019). While one systematic review identified

qualitative studies evaluating youth and caregivers' perspectives of tf-CBT (Neelakantan et al., 2019), only one of these studies specifically focused on youths' experiences (Dittmann & Jensen, 2014). This study found that youth aged 11–17 years initially experienced anxiety about discussing their trauma with an unknown person but ultimately found tf-CBT and trauma processing beneficial, particularly due to the therapist's characteristics, such as transparency and empathy (Dittmann & Jensen, 2014). Additionally, in a recent qualitative study on experiences of tf-CBT for transitional-aged youth, participants reported therapist authenticity, autonomy and control during therapy, and a sense of personal responsibility in their recovery as important aspects of the treatment (Eastwood et al., 2021). In adults with mild to moderate PTSD, i-tf-CBT has been evaluated for acceptability using a mixed methods approach. Although quantitative measures revealed high acceptance and satisfaction with i-tf-CBT, the qualitative insights highlighted the importance of personalisation based on participants' individual preferences, symptom presentation, and treatment expectations (Simon et al., 2023). However, in youth with PTSS, eCoaching and intervention factors have not yet been explored. Capturing and incorporating insights gained from qualitative data into interventions can improve their quality by tailoring them to individual needs and preferences, thus increasing the individual fit (Eastwood et al., 2021; Midgley et al., 2014). Implementing these recommendations might, in turn, mitigate dropout rates and enhance the efficacy of treatments (Plaistow et al., 2014). Therefore, this study aimed to explore youth's experiences participating in a therapist-guided trauma-focused IMI and its evaluation study, focusing on acceptability, satisfaction, and individual fit, particularly in relation to adherence and perceived effect.

2. Methods

This qualitative study was part of a one-arm proof-of-concept feasibility study evaluating a trauma-focused IMI with therapist guidance for youth aged 15–21 years with clinically significant PTSS (Schulte et al., 2022). The study was approved by the ethics committee of the German Psychological Society (DGPs, the Society, EbertDavidDaniel2020-09-16-VA) and registered in the German clinical trial register (DRKS00023341). The study was funded by the Federal Ministry of Education and Research (BMBF, grant number 01KR1804D), as part of the collaborative project BestForCan, which aims at disseminating trauma-focused cognitive behavioural therapy developed by Cohen and colleagues (2009) for children, adolescents, and young adults after child abuse and neglect (Rosner, Barke, et al., 2020). This qualitative study follows the consolidated criteria for reporting qualitative research criteria (COREQ, Tong et al., 2007, Appendix, eTable 1). Additional information on the feasibility study can be accessed via the study protocol and feasibility outcome papers (Schulte et al., 2022; Schulte, Sachser, et al., 2024).

2.1. Eligibility criteria and procedure

Participants (n = 32) of the feasibility study were recruited between July 2021 and January 2023 via online (e.g. social media) and offline (e.g. counselling services, youth clinics) recruitment channels. Participants were aged between 15 and 21 years and experienced clinically relevant PTSS (measured with the Child and Adolescent Trauma Screen for DSM-5; CATS-2 ≥ 21; Sachser et al., 2022). Participants were required to live in secure living conditions, as stipulated by current treatment guidelines for PTSD in children and adolescents (Rosner, Gutermann, et al., 2020). In accordance with these guidelines, any existing risks to the child or adolescent must be thoroughly assessed at the start of treatment. Where necessary, immediate measures should be implemented to ensure the child's safety and support their well-being. They provided written informed consent, with minors giving assent and requiring consent from caregivers or the legal guardian.

All participants completed a baseline self-rated online assessment (T1) prior to gaining access to the IMI.. Eight weeks after accessing the IMI or upon completing the eighth session of the IMI, all participants were invited to a self-rated online and a clinician-rated telephone post-assessment (T3). The qualitative interview was scheduled after the completion of the ninth session or 12 weeks following initial IMI access. Only participants who had started completing the online sessions, and had not withdrawn their study consent were invited to participate in the qualitative interview. Between January 2022 and May 2023, 28 youth out of 32 eligible participants (87%) were invited to the qualitative interview. Four participants were not invited as they did not start the online sessions. Invited participants received up to three email reminders and one phone reminder. Out of 28 participants contacted, 19 scheduled an appointment and took part in the interviews (n = 19/32, 59%). Two participants had to be excluded due to technical problems with transcription, resulting in a final sample of 17 interviews.

2.2. Trauma-focused internet- and mobile-based intervention

The content of the trauma-focused IMI was based on face-to-face tf-CBT involving common components of evidence-based manualized PTSD

treatments: psychoeducation, emotion regulation and coping, imaginal exposure, and cognitive processing (Dorsey et al., 2011; Schnyder et al., 2015). The nine sessions, consisting of eight core sessions and one booster session scheduled four weeks after completion of the core sessions, were modular in structure and thematically divided into three units: (1) safety and coping skills (sessions 1–3) involving psychoeducation, stabilisation, and emotion regulation techniques; (2) trauma processing (sessions 4–6), which was conducted through writing a trauma narrative; and (3) consolidation and integration of the traumatic event (sessions 7–9), including cognitive techniques, relapse prevention, and the booster session to foster learned skills and redefinition of goals. Participants were encouraged to complete the first to eighth sessions weekly and the ninth session after a four-week pause, spanning a total of 12 weeks.

The sessions had an expected duration of 30–60 min each and were accessible via laptop or computer on a web browser of an eHealth platform. Each session comprised text, video, and audio content, interactive components, download material, and three fictional case descriptions. In addition, a smartphone app was available to plan behavioural activation activities and reflect on the transfer and usefulness of exercises performed in daily life. The online sessions were conceptualised as a self-help intervention guided by an eCoach. The eCoach, a psychotherapist in training with a master's degree in psychology, provided semi-standardised text-based feedback on completed sessions. Participants received the written feedback in asynchronous form after completing an online-session. While certain aspects of the feedback followed a standardised format, the eCoach customised aspects such as addressing specific symptoms or the nature of the trauma. The primary aim of the feedback was to support and motivate participants while fostering adherence to the intervention. Additionally, licensed child and adolescent therapists were available upon request to provide consultation sessions to participants via telephone. For the eCoaches, supervision was offered by a licensed child and adolescent therapist. The study protocol provides detailed information on the IMI (Schulte et al., 2022).

Table 1. Example questions on the eight topics from the interview guide for the qualitative interviews.

Topic	Example Question(s)
Motivation and expectations	What motivated you to seek help at the time you signed up for the study?
	What expectations did you have of the online training before you started?
Active factors, efficacy, and individual fit	To what extent was the online training helpful for you regarding your problems?
	To what extent did you feel that the online training 'involved everything' you needed for your problems?
	What do you think you have actively contributed to changing your problems?
Working on the IMI content	How did you manage to make time for the online sessions in your everyday life?
	What else would you have needed to make more time for training in your everyday life?
Acceptance of IMI content	To what extent did you generally have the impression that the units build on each other and fit together well in terms of content?
	What moments during your training did you feel under-challenged or overwhelmed?
IMI design	What did you like and dislike about the design of the online training?
	To what extent did you have technical problems either with the online training or with the realisation of the exercises (for everyday life)?
Human guidance in IMI and study context	How did you get on with your eCoach, overall?
	How would you describe your relationship with your eCoach?
	To what extent did you feel that your problems were seen and taken seriously during the training and the study?
Evaluation of study and IMI participation	To what extent was it worthwhile for you to take part in the training?
	Based on your experience with online training, what should other young people bring with them so they can complete the training well?
Further comments and optimisation suggestions	To what extent do you have any suggestions or comments that could improve the online training and the study?
	What are your ideas on how we can reach young people and raise awareness of the study and the online training?

Note: IMI = Internet- and mobile-based intervention.

2.3. Qualitative data collection

The semi-structured interview guide contained 38 open questions organised into eight topics: motivation and expectations (4 questions); active factors, efficacy, and individual fit (8 questions); treatment adherence and everyday use of the IMI (6 questions); acceptance of the IMI content (5 questions); design of the IMI (3 questions); human guidance through the IMI and the study (3 questions); concluding evaluation of participating in the study and IMI (4 questions); and further comments including optimisation suggestions (5 questions). In addition, memo questions (e.g. 'What were your reasons for signing up?' to clarify key aspects and 'hang-on' questions (e.g. 'What else can you think of?', 'What was it like for you?', 'Can you describe it to me in more detail?') were given to ensure detailed answers and to clarify comprehension difficulties. Participants were given ample opportunity to elaborate on their responses, with the interviewer proceeding to the next question only after participants had fully conveyed their thoughts or indicated they had nothing further to add. Example questions for each topic are shown in Table 1. The complete list of questions can be found in the Appendix (eTable 2).

The semi-structured interview guide was partly based on expert considerations of relevant aspects of assessing the overall experiences of youth with the trauma-focused IMI, and partly based on theoretical models of the acceptability of healthcare interventions (Sekhon et al., 2017) and the integration of human support (Efficiency Model of Support; Schueller et al., 2017). The model for the acceptability of healthcare interventions was chosen because it offers a comprehensive framework that captures how individuals perceive the appropriateness of these interventions, considering their expected and actual cognitive and emotional responses, such as coherence, perceived burden, and effectiveness (Sekhon et al., 2017). The Efficiency Model of Support was chosen as it emphasises human support in IMIs and how the interaction between self-directed participation and human guidance might influence the efficacy of the intervention (e.g. in terms of individual fit; Schueller et al., 2017).

The interviews were conducted between January 2022 and May 2023 by a female researcher (CS). CS conducted and analyzed the interviews as part of her doctoral studies and was in training to become a licensed therapist. She had no prior relationship with the participants but was involved in the development of IMI and filmed videos for the IMI sessions in which her voice was heard. Participants were informed at the beginning of the qualitative interview that CS was involved in the development of IMI and was interested in their general experiences with IMI. The interviews were conducted via phone and audio-recorded via PhonerLite (Sommerfeld, 2019). The average duration of an interview was 48 minutes ($SD = 13$, range: 28–70). The audio recordings were transcribed verbatim and thereby anonymized using a transcription guide and the software tool MAXQDA (VERBI Software, 2021).

2.4. Quantitative data collection

We report quantitative data from T1 and T3 assessments to compare interviewees with non-interviewed feasibility study participants based on several characteristics: sample characteristics include sociodemographic data (e.g. age, gender, residence, education) and self-reported data on health (e.g. prior treatment, physical disease, mental disorder). Satisfaction and acceptability were assessed with the Client Satisfaction Questionnaire in its version adapted for Internet interventions (CSQ-I; eight items, score range: 8–32; $\alpha = .95$; scores > 23 indicate high satisfaction; Boß et al., 2016) at T3, and the Attitudes towards Psychological Online Interventions Questionnaire (APOI; 16 items; score range: 16–80; higher scores on the total scale indicate more positive attitudes; Schröder et al., 2015) at T1 and T3. Intervention adherence was assessed by the number of completed online sessions

and objective user data (e.g. number of logins, number of messages). Symptom severity in terms of PTSS was assessed with the CATS-2 *DSM-5* scale (20 items; score range: 0–60, $\alpha = .81$; Sachser et al., 2022) at each time point (T1, T3) and the 15-item screen for exposure of potentially traumatic events of the CATS was used to assess traumatic events at screening (PTE-checklist). Diagnosis of PTSD was assessed with the Clinician-Administered PTSD Scale for *DSM-5* Child and Adolescent Version (CAPS-CA-5) by licensed psychotherapists (20-item *DSM-5* scale; score range: 0–80; $\alpha = .76$; Pynoos et al., 2015) at T1 and T3. All quantitative data is reported for study completers only, meaning those who provided data in the online – and telephone assessments at T3. A detailed description of assessments is reported in the study protocol (Schulte et al., 2022) and a detailed sample description can be found elsewhere (Schulte, Sachser, et al., 2024).

2.5. Data analysis

Qualitative content analysis with a deductive-inductive approach was carried out following the established processes in qualitative research (Mayring, 2015) to synthesise interview data and determine elements relevant to the study topic. A second rater, JW, was involved in the qualitative data evaluation to ensure the reliability of the findings. JW was an independent research assistant with no prior relationship to the participants (eFigure 1 in the Appendix depicts the complete procedure, including data collection and analysis): (1) Main categories based on the topics of the interview guide were derived (deductive approach). (2) Initial coding rules were developed that define one sentence as the smallest coding unit and a complete statement as a context entity. (3) Two independent coders (CS, JW) worked through the transcribed material simultaneously and derived subcategories and codes (inductive approach) with the goal of code saturation. Subcategories were reorganised, codes were added or adapted, and coding rules were redefined and completed. Regular consensus meetings (JW, CS, AZ) were held to discuss the structure of the code system, the code definitions, and example statements. Preliminary coding systems were tested and revised according to the feedback. In this process, the gradual inclusion of the raw material resulted in including 100% of the material ($n = 17$). (4) The preliminary code system and coding rules were tested for comprehensibility and completeness in one of the transcribed interviews (2%, $n = 1$). (5) Final adaptations of the code system and coding rules were performed (CS, JW). (6) Two independent coders carried out the final coding on 100% ($n = 17$) of the transcribed material (JW, CS). (7) Cohen's Kappa was determined in terms of the presence of a code in

the document, the frequency of a code in the document, and the overlap of codes (at least 90%) of each coded segment (Mayring, 2015). Values of κ < .41 were rated as low, κ = 0.41–0.60 as moderate, κ = 0.61–0.80 as substantial, and values κ ≥ 0.81 were rated as (almost) perfect agreement (Brennan & Prediger, 1981; Landis & Koch, 1977). Determination of the coded material resulted in a 96% overlap in terms of presence of a code in the document, 91% in terms of frequency of a code in the document, and 76% in terms of code overlap (at least 90%) of each coded segment with Kappa of κ = .76. MAXQDA (VERBI Software, 2021) was used for qualitative data analysis, and SPSS 29 (IBM Corp., 2017) was used for quantitative data analysis.

3. Results

3.1. Participant characteristics

Out of the 28 participants contacted, 19 scheduled an appointment and participated in the interviews (n = 19/32, 59%), though two had to be excluded due to technical issues with the audio recordings. Interview participants were on average 19 years old ($SD = 1.8$) and predominantly female (77%, $n = 13/17$). Their baseline level of PTSS was high ($M = 30.9$, $SD = 8.8$) and the majority fulfilled diagnostic criteria for

Table 2. Sociodemographic data at baseline assessment from interviewed and non-interviewed participants.

	Interviewed participants (n = 17)	Non-interviewed participants (n = 15)
Age M (SD)	19 (1.8)	19 (1.7)
Gender n (%)		
Female	13 (77)	15 (100)
Male	3 (18)	0 (0)
Diverse	1 (6)	0 (0)
Self-reported mental disorder(s) n (%)		
Lifetime diagnosis of any mental disorder	10 (59)	8 (53)
Depression	8 (47)	5 (33)
PTSD	3 (18)	5 (33)
Borderline personality disorder	2 (12)	1 (7)
Anxiety disorder	2 (12)	1 (7)
Attention deficit hyperactivity disorder	1 (6)	0 (0)
Bulimia nervosa	1 (6)	0 (0)
Personality disorder (not defined)	1 (6)	0 (0)
Alcohol consumption disorder	1 (6)	0 (0)
Previous treatment (for any mental disorder) n (%)	8 (47)	8 (53)
Physical disease n (%)	1 (6)	5 (33)
PTSS (CATS), M (SD)	30.9 (8.8)	32.5 (6.4)
PTSD diagnosis (CAPS-CA-5, clinician-rated), n (%)	11 (76%)	13 (86%)

Note: CAPS-CA-5 = Clinician-Administered PTSD Scale for *DSM-5* - Child and Adolescent Version (Pynoos et al., 2015). *M* = mean. PTSD = post-traumatic stress disorder. PTSS = post-traumatic stress symptoms measured with CATS (Child and Adolescent Trauma Screen; Sachser et al., 2022). *SD* = standard deviation. T1 = Baseline, self-rated online assessment before IMI access.

PTSD according to CAPS-CA-5 (76%, $n = 11/17$). Interview participants were representative of non-interviewed participants on sample characteristics except for symptom burden, which was slightly higher in the non-interviewed sample (Table 2). Regarding the type of trauma experienced, interviewed participants reported having experienced sexualised violence (71%, $n = 12/17$), bullying (35%, $n = 6/12$), family violence (29%, $n = 5/17$), other stressful or scary events (23%, $n = 4/17$), witnessing violence in the family (12%, $n = 2/17$), sudden death of a loved person (12%, $n = 2/17$), or a medical event (12%, $n = 2/17$). A comparison of the traumatic events reported by interviewed and non-interviewed participants can be found in the Appendix (eTable 3).

3.2. Comparison between interviewed and non-interviewed participants on quantitative findings

3.2.1. Satisfaction and acceptability

Satisfaction among interviewed participants was high at T3 ($M = 27.5$, $SD = 4.1$, range: 16–32, $n = 15/17$) and greater than the satisfaction score of non-interviewed participants, which was just below the threshold for high satisfaction ($M = 22.7$, $SD = 7.8$, range: 8–32, $n = 7/15$). The results of the APOI can be found in the Appendix (eTable 4).

3.2.2. Intervention usage

More than half of the interviewed participants had completed the IMI's eight core sessions ($n = 10/17$, 58%) whereas none of the non-interviewed participants completed all eight core sessions. Overall, the intervention usage of interviewed participants was higher than those of non-interviewed participants (see details in the Appendix, eTable 5).

3.2.3. Symptom severity

PTSS decreased both by 9 points from T1 to T3 in the group of interviewed participants (T1: $M = 30.9$, $SD = 8.8$, $n = 17/17$; T3: $M = 21.5$, $SD = 9$, $n = 15/17$) and the group of non-interviewed participants (T1: $M = 32.5$, $SD = 6.4$, $n = 15/15$; T3: $M = 24$, $SD = 14$, $n = 7/15$). CAPS severity decreased both by 10 points in the group of interviewed participants (T1: $M = 31.8$, $SD = 8.9$, $n = 17/17$; T3: $M = 21.1$, $SD = 11.7$, $n = 16/17$) and non-interviewed participants (T1: $M = 31.1$, $SD = 6.8$, $n = 15/15$; T3: $M = 21.2$, $SD = 13.3$, $n = 6/15$).

3.4. Qualitative findings

In total, 20 themes were identified and organised under nine dimensions: participation motivation and expectations; recruitment process; treatment adherence and everyday use of therapeutic exercises; trauma processing; non-trauma processing intervention

components; technology, structure, and design of the IMI; human support in IMI and the study; individual fit of IMI and study parameters; and active factors and efficacy.

For each theme, the most frequently reported codes are presented below and illustrated with a quote. Additionally, opposing codes or diverse cases were included to reflect the heterogeneity of the findings and to address less commonly reported experiences. Quotes are attached with participant tags (p1-p17) to demonstrate representation across the sample. The following terms are used to indicate the number of participants expressing a particular theme, experience, or idea: a few (3–5), some (6–8), and many (≥ 8; Sandelowski, 2001). An overview of all identified themes with descriptions and quotes for illustration can be found in the Appendix (eTable 5).

3.4.1. Participation motivation and expectations

The dimension 'participation motivation and expectations' entailed various *expectations for the IMI* regarding its content, structure, and efficacy, as well as the *motives* for participating in an IMI study, which also encompassed the barriers to other help-offers. *Barriers to on-site psychotherapy*, such as limited availability and long waiting times, motivated many to participate in the study ($n = 14$; 82%), with one participant expressing the high effort required to get into therapy.

> It's so hard to get a spot in therapy. I think people are also somewhat put off by all this bureaucratic stuff. You have to contact a thousand different places and make a lot of phone calls before you might get something. (p2)

An IMI therefore seemed 'more practical, because you can do it from home' (p4), meaning time- and place-independent use was another motivator for many ($n = 10$; 59%).

The expectations towards the IMI were few, with most participants having an *exploratory attitude* towards the IMI and the study with no concrete idea of its structure and content but being willing to try it out ($n = 12$, 71%). However, many expected to *acquire strategies* to cope with the trauma and related symptoms ($n = 10$, 59%). One example quote illustrating both themes is as follows:

> I didn't have super high expectations, to be honest. I mean, I thought that it would help me with strategies and stuff, but I didn't know how it worked exactly because I'd never had any experience with it … then I thought, okay, I'll just try it out and see if it works or not. (p17)

Two participants expected to 'start to kind of process everything and start to deal with it' (p2) or to 'kind of deal with my traumas' (p5), indicating that the expectation of *trauma processing* within the IMI ($n = 2$, 12%) also remained rather vague.

3.4.2. Recruitment process

The dimension 'recruitment process' comprised various *recruitment channels* through which participants became aware of the study or which were indicated as relevant for reaching out to youth with PTSS, as well as the *characteristics of the study registration and inclusion process*. Many participants found that recruitment via *media*, especially through advertising on social media platforms such as Instagram, would be most effective in reaching youth with PTSS ($n = 13$, 76%). Additionally, many youth indicated *professionals* as effective referrers ($n = 8$, 47%). A quote illustrating both themes is as follows:

> Maybe write to each therapy center to see if they can put out flyers? For those who have the problem of not being able to speak to someone in person. So just that at every therapy and counseling center, that they briefly tell you about it or that you maybe post it on Instagram or write to Instagram, to see if they can advertise it. (p8)

The majority of participants reported experiencing a certain amount of timing, structural or psychological strain during the study registration process, but overall, they still found it *acceptable in terms of the effort* required ($n = 16$; 94%). One quote illustrates this perception as follows:

> Generally not that complicated. The phone call was (…) I think over an hour. I haven't had a phone call that long for a while (laughs). But that's not a problem at all. (p1)

Two participants had difficulties indicating an emergency contact during the registration process ($n = 2$; 12%), with one of them perceiving it as 'the hardest part to find someone who could be an emergency contact' and 'talking to people about it' (p9). Conversely, two participants saw *advantages in the emergency plan and contact*, appreciating the involvement of another person ($n = 2$; 12%) and perceived that 'it's generally a good idea to have a second person involved, someone to talk to in case the staff get the impression that something worse might be going on (…)' (p15).

3.4.3. Treatment adherence and everyday realisation of therapeutic exercises

The dimension 'treatment adherence and everyday use of therapeutic exercises' entailed both the *supporting adherence and everyday-transfer factors* and the *hindering adherence and everyday-transfer factors* identified by youth to completing the online sessions of the IMI and implementing the therapeutic exercises in their everyday life. Most of the supporting factors for treatment adherence and everyday use were intrinsic factors, such as characteristics, attitudes, or participant beliefs. Half of the participants stated that *self-organisation* – meaning the sense of self-determined and flexible planning of when they planned to conduct

the sessions and the hours they wanted to spend on the session – was a supporting factor for carrying out and implementing the IMI and therapeutic exercises ($n = 9$, 53%). One tag summarising this theme is as follows:

> I always write a plan for the week at the beginning of the week, so I immediately check which day I have the most time, to make sure that I don't start the training when I'm already stressed or something. In other words, I wrote it down in my schedule and it always worked out. (p1)

Another supporting factor of treatment adherence and everyday use of therapeutic exercises was the *belief in the benefit*s of the IMI, either due to experiencing its efficacy first-hand and 'just [noticing] how good it is for me' (p11), or because of the feeling of doing something good for one's future ($n = 3$, 18%). However, some others ($n = 3$, 18%) expressed experiencing *a lack of efficacy* as a hindering factor in treatment adherence and everyday use. For example, one participant clearly stated: 'I mean, I haven't gone any further with it at all. The reason being that I don't feel that it has helped me' (p2). The most common hindering factors mentioned by a few participants were external barriers like experiencing *external stressors* related to work or leisure activities ($n = 6$, 35%), lack of time ($n = 5$, 29%), or technical restrictions such as problems with the internet connection ($n = 5$, 29%).

3.4.4. Trauma processing

The 'trauma processing' dimension covered the *challenges* that youth anticipated or experienced during trauma confrontation or its practical usage, as well as the reasons for an overall *positive evaluation of the trauma processing*. A total of 10 participants (59%) expressed at least one challenge related to trauma processing. Most frequently, participants described experiencing or fearing an *increase in negative symptoms due to trauma processing* ($n = 7$, 41%), as one participant stated:

> What I didn't want to do at the beginning was writing the blog article, because I had the feeling that I would end up falling further into it and that it would really disturb me. (p7)

A few experienced a *lack of therapeutic support* when imagining or going through the trauma processing as they felt 'just kind of alone with it all' after 'turning off the laptop' and found that 'there was probably something missing' (p2). From these ten participants expressing at least one challenge, six participants (60%) still came to an overall *positive evaluation of the trauma processing*. Furthermore, seven participants evaluated trauma processing as positive without expressing any challenges, resulting in a total of 13 participants ($n = 13/17$, 76%) with an overall positive evaluation of trauma processing. Most often, this positive evaluation was the result of participants reframing

challenges in light of the fact that processing the trauma was helpful or even necessary for improvement, which could be summarised as *trauma processing is challenging but helpful* ($n = 9$, 53%). One quote illustrates this perception as follows:

> I found it very difficult to write the trauma narrative. But in the end, it was good that I really dealt with it, because it allowed me to come to some kind of peace with it. The fact that I wrote it down. (p8)

3.4.5. Non-trauma processing intervention components

The dimension 'non-trauma processing intervention components' included youths' ratings of non-trauma-processing components as either *helpful* or *unhelpful components* in processing the sessions or implementing them in daily life. Overall, there were more components found to be helpful than unhelpful. Almost all participants found the affect regulation techniques, including breathing, self-soothing, and distress tolerance techniques, helpful when completing the sessions or using them in everyday life ($n = 16$, 94%). For example, one participant stated that it

> helped me in everyday life in particular because when I needed to calm down or when I was feeling bad, I would try smelling these essential oils or something, for example. After all, I always had them with me in my bag. (p10)

In contrast, the imagination-based emotion regulation techniques were perceived as unhelpful by one-third of participants ($n = 5$, 29%), stating that 'imagine that the thoughts are floating away on the clouds' was 'definitely not helpful', because 'maybe I just couldn't feel my way into it or somehow can't take it seriously enough' (p3) and found the idea of putting feelings on a cloud 'strange'. The remaining intervention components, such as affect regulation techniques, motivational goal setting, or the fictional case descriptions, were rated as unhelpful by only one or two participants but were rated as helpful by several others.

3.4.6. Technology, structure, and design of the IMI

The dimension 'technology, structure, and design of the IMI' entailed both *positive* and *negative aspects* related to these elements of the IMI. Overall, there were more positive aspects of the IMI emphasised than negative aspects regarding technology, structure, and design of the IMI. Almost all participants highlighted the *clearly structured content* as a positive aspect of the IMI ($n = 16$, 94%).

> So it was definitely well structured, the content was consistent, the sessions built upon each other very nicely and there was always a short reminder at the beginning about what happened in the previous session. (p7)

Additionally, the *appealing design*, including illustrations that 'felt sort of calm' (p12) and an intuitive layout that facilitated usability, was also highlighted as a positive aspect, as was the use of *metaphors* (each *n* = 16, 94%). However, two youth perceived the *metaphors as inappropriate*, finding them too simple to help explain their burden (*n* = 2, 12%). The most frequently mentioned negative aspect was *technical usage problems* in the sense of programming errors, which meant that 'several things, such as text labels, (…) just weren't displayed or only the code was shown' (p7) or that there were problems with the app functions, such as journaling or planning positive activities (*n* = 10, 59%).

Furthermore, some participants found the content to be overloaded (*n* = 4, 59%) and some IMI components to be poorly integrated or structured (e.g. the app activity planner; *n* = 4, 59%), leading to confusion and dissatisfaction with the IMI: 'And just in general, the activity planner was a bit confusing, difficult to find once I'd lost it and barely explained at all or integrated into the training itself. I thought that was a little disappointing' (p7).

3.4.7. Human support in IMI and the study

The dimension 'human support in IMI and the study' included both the *positive aspects* of human support, such as eCoaching and contact with licensed psychological therapists during diagnostic interviews or telephone consultation sessions, as well as interactions with the study team. It also addressed the *negative aspects* related to these interactions. Most participants appreciated the *beneficial interpersonal factors and communication* throughout the IMI and the study, such as empathy, trust, respect, and feeling as though they were taken seriously (*n* = 16, 94%). One participant summarised their experience with the eCoach and the study team as follows:

> Respectful. Just very understanding. Definitely nothing negative. Yeah, they just value you. I think I could have written anything, any problem, and she [the eCoach] would have always listened and would have always been able and willing to help me. (p11)

However, some participants reported that they did not perceive the contact with the eCoaches as a real, trusting relationship. One participant stated, 'I don't feel that I really built up a mutual trust or anything' (p2), which was framed in terms of a *lack of a therapeutic relationship* within the intervention (*n* = 6, 35%). Some also experienced *deficits in interpersonal factors and communication*, as they 'didn't really feel heard' (p7) (*n* = 4, 24%). This was especially relevant for one of these four participants, who reported feeling disappointed by the fact that the eCoach changed during the study participation.

3.4.8. Individual fit of IMI and study parameters

The dimension 'individual fit of IMI and study parameters' included perceived *requirements for the individual fit* of the IMI that youth considered necessary for good feasibility based on their experiences with the IMI and the study. It also covered *suitable aspects* and *unsuitable aspects* of the IMI and study concerning their needs, as well as *suggestions for optimising* the individual fit. *Acceptance and willingness to change*, including accepting that the trauma has happened, the willingness to deal with the traumatic memories, and the necessity to be honest with oneself, were seen by many participants as a prerequisite for participation in the IMI and the study (*n* = 10, 59%). One participant expressed this condition in the following words:

> The courage to deal with it – with what you've been through, with the trauma, and yeah, you have to do that in the lessons, so it would definitely be good for you to more or less feel ready to do that. (p4)

Most participants found at least some, and in certain cases all, of the IMI components to be suitable and tailored for their needs or that they were building upon their previous knowledge, leading *to satisfaction with the therapeutic content* (*n* = 14, 82%). However, more than one-third of participants expressed unsuitability of the IMI and study parameters due to a *lack of personal contact* with eCoaches or psychotherapists, instead expressing a need for real-person interactions (*n* = 6, 35%). One participant very clearly stated that she was 'just more suited for something in person. For me, any online therapy – no matter how good or bad it is – just can't replace that, I think' (p2). Consequently, more than half of the participants suggested more *personalised guidance*, with less manualized eCoach feedback 'to be reminded again that it's not just some kind of chatbot behind the scenes' (p6), especially during the trauma-confrontation phase, or live video sessions with eCoaches or psychotherapists (*n* = 9, 53%). However, one person would have preferred *less personal contact* within the IMI, meaning fewer telephone contacts with the psychotherapists for the diagnostic assessments (*n* = 1, 6%).

Another frequently mentioned optimisation suggestion was to have a *broader choice* (*n* = 6, 35%) in the selection of intervention components or in the selection of the order and timing of the sessions. For example, one participant wished to have 'a sort of second alternative path or something' (p15). Further, some suggested to *enhance the activation and integration of IMI content* (*n* = 6, 35%), such as incorporating interactive videos or 'a bit more and clearer instructions' (p2). Some suggested to *simplify the study registration process* (*n* = 3, 18%), for example by making use of online forms instead of emails or generally using less emails, and one participant wished

to have local tips for behavioural activation (n = 1, 6%). Overall, the optimisation suggestions dimension was the one with the most themes identified and the highest heterogeneity.

3.4.9. Active factors and efficacy

The dimension 'active factors and efficacy' encompassed the *active factors* perceived by youth that potentially contributed to individual changes, as well as the aspects in which they experienced the *efficacy* of participating in the IMI or study. The majority of participants indicated that *processing and applying the IMI content*, in terms of actively engaging with the session content, carrying out the therapeutic exercises (e.g. relaxation techniques, trauma confrontation), and integrating and applying the 'things learned' into everyday life contributed to the perceived changes and thus represented an active factor (n = 12, 71%). Approximately half of the participants (n = 8, 47%) stated that *dealing with the trauma* in the form of 'all that writing' in the IMI sessions had 'helped a lot to sort and process everything' (p3).

In terms of the perceived efficacy of the IMI, most participants reported *improved coping with trauma and symptoms* (n = 12, 71%), indicating that they were more able to use coping strategies if symptoms occurred or that they had come to a more helpful appraisal of the trauma and its consequences. One participant stated: 'It's not like 'oh god, oh god, something was done to me and now I won't be happy for the rest of my life', but it's more like 'yes, it happened, my life goes on' (p4). The improved coping was often accompanied by an *enhanced understanding of the disorder* (n = 10, 59%), which enabled the participants to better categorise and normalise symptoms and 'be a bit more objective and don't immediately become emotional and start spiralling. Just this sort of understanding of it' (p1).

4. Discussion

This qualitative study is the first study to examine participants' perspectives on the feasibility of a trauma-focused IMI using qualitative content analysis. Youth who chose toparticipate in the interviews were comparable in sociodemographic characteristics and symptom severity to those who did not participate.. However, satisfaction and adherence to the intervention was slightly higher in interviewed versus non-interviewed participants. The satisfaction of interviewed participants with the therapeutic content and its everyday use were mirrored in the fact that more positive than negative aspects of the design were highlighted by participants. Moreover, helpful IMI components were coded significantly more frequently than unhelpful components, and a majority expressed satisfaction with the IMI. Frequently

mentioned suggestions for optimisation related to the type of guidance, the choice of exercises, and the expansion of the app function.

Participants valued the flexibility and accessibility of the IMI, which addressed barriers to on-site therapy. Recruitment via social media and professionals was effective, and while the registration process was manageable, some simplifications were suggested. Youths approached the IMI with open and exploratory expectations, hoping to gain strategies for managing trauma and its symptoms. Adherence was supported by organisational skills but hindered by external stressors and limited time. Trauma processing was challenging due to symptom exacerbation and avoidance but was ultimately seen as necessary and effective by most participants. To optimise the individual fit of therapeutic intervention components, more flexibility in the choice of techniques and sequencing and scheduling of sessions was proposed. The interpersonal contacts were often perceived positively, but some did not view their interactions with the eCoach as constituting a true therapeutic relationship. However, some participants reported that such a therapeutic relationship would have been an important supportive factor in trauma processing, or would have been relevant to individual fit. Many suggested that human guidance in the IMI should be more personalised. Acceptance and willingness to change were viewed as critical for success, and active engagement improved coping with trauma and related symptoms.

The unclear expectations towards a trauma-focused IMI might partly reflect the lack of research and available or known IMIs for youth with traumatic experiences. However, it might also suggest a more general lack of knowledge in youth regarding psychotherapy, PTSD and related symptoms, and the fact that PTSD is treatable. Such knowledge is relevant before or when start treatment for PTSD to mitigate a rise in treatment anxiety (Dittmann & Jensen, 2014), which may otherwise lead to premature termination of the intervention. Moreover, meta-analytic evidence suggests that higher treatment expectancy serves as a predictor for higher treatment adherence in IMI studies (Beatty & Binnion, 2016). The reasons for participating in the IMI expand the quantitative results of the feasibility study, in which a preference for self-help and perceived attractiveness of an IMI were indicated as the most common reasons for participation, along with overly long waiting times for on-site psychotherapy (Schulte, Sachser, et al., 2024). Both qualitative and quantitative results align with findings from previous qualitative studies evaluating barriers to mental health care for trauma-exposed youth (Ellinghaus et al., 2021) and youth in general (Pfeiffer & In-Albon, 2022). Together, results highlight not only the lack of available therapists but also individual

challenges with face-to-face therapy, such as not wanting to disclose one's experiences to a therapist or fearing or experiencing invalidating or negative reactions from professionals.

The factors supporting and hindering treatment adherence and the everyday use of therapeutic exercises in everyday life in our study are in line with those found in an IMI study on adult patients with depression (Donkin & Glozier, 2012) and meta-analytic evidence of predictors of intervention adherence in IMI studies (Beatty & Binnion, 2016). Donkin and Glozier (2012) identified that intrinsic motivations, such as perceived treatment benefits and a sense of control, were crucial for engagement in the IMI, while results of a meta-analysis suggested that sufficient time and personalised IMI content might serve as predictors for higher adherence (Beatty & Binnion, 2016). Similarly, our study highlighted self-organisation and a wish for a more self-directed selection of exercises and session timing as relevant factors for programme adherence. This suggests that having the feeling of control might also be important for successful engagement of therapeutic exercises in everyday life among young people. Indeed, early research has shown that taking into account youths' need for independence and autonomy might contribute to increase satisfaction with therapy (Church, 1994), and the need for control might be particularly pronounced among trauma survivors, who often experience a sense of powerlessness during traumatic events (Harvey, 2000; Skinner et al., 2019).

Many participants in the current study reported experiencing challenges related to trauma processing, such as increased negative symptoms or avoidance. These results align with findings from face-to-face tf-CBT, where terms like 'difficult,' 'potentially distressing,' 'emotionally upsetting,' 'painful,' or 'just feeling scared about thinking about it' are commonly used to describe trauma processing (Dittmann & Jensen, 2014; Eastwood et al., 2021). At the same time, the majority of youth seemed to recognise the necessity of facing and overcoming these challenges as essential for recovery (Dittmann & Jensen, 2014; Eastwood et al., 2021). Our results suggest that psychoeducation, normalising reactions, and explaining the rationale for trauma-focused intervention components, which were all part of the IMI, might enhance understanding, motivation for change, and ultimately adherence to the IMI.

The type and intensity of guidance emerged as relevant factors for IMI engagement in our sample, with participants expressing a wish for frequent or more personal contact. Meta-analytic research investigating the role of guidance in IMIs for mental disorders like depression and anxiety has found that guided IMIs improve adherence rates compared to unguided IMIs, especially in severely affected individuals (Domhardt et al., 2019; Karyotaki et al., 2021; Musiat et al., 2022; Zarski et al., 2016). Qualitative findings in face-to-face tf-CBT highlight the importance of the quality of the therapeutic relationship, including authentic care, transparency, empathy, and professionalism (Dittmann & Jensen, 2014; Eastwood et al., 2021). Given that providing extensive therapeutic guidance in IMIs is costly, time-consuming, and potentially affects scalability and IMI implementation, the ability to build a therapeutic alliance under brief and virtual conditions is important. Though an i-tf-CBT study on adults showed that alliance was rated lower at post-treatment compared to face-to-face CBT (Simon et al., 2023), research into the quality of the therapeutic relationship in IMI studies suggests that high levels of working alliance can nonetheless be achieved (Bur et al., 2022; Doukani et al., 2024). Moreover, one study on a transdiagnostic intervention for students found no superiority of human guidance over technological guidance, indicating that automated guidance might be a promising way to promote treatment adherence and should be further evaluated (Koelen et al., 2024). Overall, while many participants desired more support, others preferred less contact or none at all, suggesting that tailoring the intensity and frequency of human guidance to individual patient needs could be beneficial.

4.1. Limitations

Several limitations must be considered when interpreting the results. First, all interviewees began and completed at least four sessions of the trauma-focused IMI, meaning the findings may not adequately reflect the views of those who did not start or who terminated prematurely; it is possible that the present findings overestimate positive views of the IMI. However, individuals who terminated their participation in the IMI prematurely were also invited to participate in the current study, though they could not be reached despite multiple attempts to contact them. Second, our deductive-inductive analysis did not achieve full saturation. Interviewing more participants, which was not possible due to the small overall sample from the original study, might have led to higher saturation. Third, the interviews were conducted by a person involved in the development and evaluation of the IMI, which may have introduced bias in analyzing and interpreting the results. To ensure the reliability of the findings, a second-rater, who was not involved in the IMI's development and evaluation, also analyzed and interpreted participant responses. Additionally, participants were informed of the interviewer's involvement in IMI development prior to the interviews, which may have made them hesitant to give critical feedback. Fourth, although the interviews were scheduled immediately after intervention

completion, some interviews were delayed, increasing the likelihood of recall bias. In other cases, the interviews took place when the intervention was (not yet) completed, thereby limiting the ability to speak about experiences with the full content of the intervention.

4.2. Future research

This qualitative interview study on a trauma-focused IMI with therapist guidance for youth revealed important considerations that require further investigation and highlights factors that may help to improve the feasibility of a digital trauma-focused IMI in youth. To clarify intervention expectations, reduce treatment-related anxieties, and foster intervention adherence, future research could explore acceptance-facilitating interventions (AFIs; e.g. Baumeister et al., 2014; Ebert et al., 2015) before IMI use. AFIs may improve users' attitudes by presenting beneficial information in various formats (e.g. video, paper brochure). For youth with PTSS, AFIs could focus on providing information through a video with a professional, as transparency, empathy, and expertise have been shown to alleviate therapy concerns in traumatised youth undergoing trauma treatment (Dittmann & Jensen, 2014). However, to the best of our knowledge, AFIs have only been developed for adults, and we are not aware of any AFIs focusing on increasing acceptance of PTSD treatments.

Future studies should also investigate strategies to better engage participants in qualitative research who either never start treatment or discontinue prematurely. Inviting them to participate in a brief interview or write a short text about their experiences after stopping the intervention – while offering additional incentives – could improve outreach to this critical target group. Incorporating their perspectives could enhance treatment engagement and help identify contraindications that might prevent an IMI from being effective due to poor fit. Moreover, using an iterative development process and incorporating user feedback regarding intervention design, structure, and technology can address technical issues and identify which content should be reviewed to prevent content overload and ensure its relevance. Likewise, it may be helpful to integrate successful recovery narratives, particularly during the 'challenging but helpful' trauma processing phase, to foster intrinsic motivation and adherence to treatment. Indeed research has shown that these can increase participants' feelings of connectedness, hope, and self-efficacy, ultimately motivating their own engagement (Lyons et al., 2021). Additionally, a motivational messaging system, in which messages are delivered to participants by a virtual agent with content developed by experts in

the field of PTSD therapy, has been shown to be effective in adult PTSD IMIs (Tielman et al., 2019) and could also enhance motivation and trust in the therapy process for youth.

Tailoring the IMI to individual needs likely involves offering greater flexibility in selecting therapeutic techniques and the sequencing of sessions. However, it should be noted that empirically-supported manualized treatments for PTSD have a clear sequence of treatment components. Adherence to these manuals is strongly emphasised and the impact of changes to the intervention components on its efficacy remains unclear. To bridge the gap between fidelity and flexibility, future IMI studies should whether investigate personalised approaches, in which a case formulation approach is used to implement evidence-based treatment of PTSD, can be transferred to the digital setting (Galovski et al., 2024). Our findings suggest varying needs among youth regarding the intensity of therapeutic support, especially – but not exclusively – during trauma processing, highlighting the need for an individualised guiding approach. Offering optional video-based sessions or integrating IMI into a blended care approach could improve the fit for some participants. For others, these options may mitigate their need for autonomy and independence, thus negatively impacting engagement and eliminating the benefits of low-threshold self-help. More research is needed to explore ways to offer personalised therapeutic support while maintaining IMI scalability. This should include identifying factors that influence the need for varying levels of guidance for trauma-exposed youth and enabling early intervention adaptation, like in a stepped care approach, to better meet individual needs.

4.3. Conclusion

This study is the first to evaluate youths' perspectives on the feasibility of a trauma-focused IMI using qualitative content analysis. The findings indicate that the IMI was generally accepted and appreciated in terms of design, structure, technology, and interventional components by the participants, supporting ongoing research on trauma-focused IMIs for youth. Overall, more positive than negative aspects of IMIs were reported, and the non-trauma processing components were globally perceived as helpful. Trauma processing presents various challenges similar to those in face-to-face therapy. However, like in face-to-face therapy, these challenges can often be overcome through understanding the therapy rationale, thus making trauma processing a commonly recognised active factor in the treatment. Further research is needed to optimise the degree of individualisation of the intervention and the intensity of therapeutic support.

Acknowledgements

Disclosure statement

Funding

Data availability statement

Access to the anonymized interview transcripts and the interview guide (in German) can be provided to fellow researchers upon request, depending on specified data security and data exchange regulations.

Authors' contributions

All authors have read and approved the final manuscript. DE received funding for this study. CeS drafted the original design of the study for the grant application and advised CS and ACZ on the design of the intervention. ACZ and CS developed and implemented the intervention and the study and developed the interview guide for the qualitative interviews. CS conducted and coded the interviews, drafted the manuscript, and was supervised by ACZ.

Ethics approval and consent to participate

The DGPs approved the research protocol (*DGPs, the Society,* EbertDavidDaniel2020-09-16-VA). The consent to participate is available in German and was reviewed by the Institutional Review Board (DGPs). The study is registered in the German Clinical Trial Registry (GCTR, DRKS00023341), registered on 20 July 2021, https://www.drks.de/drks_web/navigate.do?navigationId=trial.HTML&TRIAL_ID=DRKS00023341

Consent for publication

All authors have read the manuscript and approved its publication.

Date of first enrolment

04 August 2021.

ORCID

Christina Schulte http://orcid.org/0009-0003-1674-4872
Anna-Carlotta Zarski http://orcid.org/0000-0002-0517-6668

References

Baumeister, H., Nowoczin, L., Lin, J., Seifferth, H., Seufert, J., Laubner, K., & Ebert, D. D. (2014). Impact of an acceptance facilitating intervention on diabetes patients' acceptance of internet-based interventions for depression: A randomized controlled trial. *Diabetes Research and Clinical Practice*, *105*(1), 30–39. https://doi.org/10.1016/j.diabres.2014.04.031

Beatty, L., & Binnion, C. (2016). A systematic review of predictors of, and reasons for, adherence to online psychological interventions. *International Journal of Behavioral Medicine*, *23*(6), 776–794. https://doi.org/10.1007/s12529-016-9556-9

Boß, L., Lehr, D., Reis, D., Vis, C., Riper, H., Berking, M., & Ebert, D. D. (2016). Reliability and validity of assessing user satisfaction with web-based health interventions. *Journal of Medical Internet Research*, *18*(8), e234. https://doi.org/10.2196/jmir.5952

Brennan, R. L., & Prediger, D. J. (1981). Coefficient kappa: Some uses, misuses, and alternatives. *Educational and Psychological Measurement*, *41*(3), 687–699. https://doi.org/10.1177/001316448104100307

Bur, O. T., Bielinski, L. L., Krauss, S., Häfliger, A., Guggisberg, J., Krieger, T., & Berger, T. (2022). Working alliance and adherence mediate the effect of guidance in a web-based program for participants with mild to moderate depressive symptoms: A secondary mediation analysis. *Internet Interventions*, *30*, 100593. https://doi.org/10.1016/j.invent.2022.100593

Church, E. (1994). The role of autonomy in adolescent psychotherapy. *Psychotherapy: Theory, Research, Practice, Training*, *31*(1), 101–108. https://doi.org/10.1037/0033-3204.31.1.101

Cohen, J. A., Mannarino, A. P., & Deblinger, E. (2009). *Traumafokussierte kognitive Verhaltenstherapie bei Kindern und Jugendlichen*. Springer-Medizin-Verl.

Dittmann, I., & Jensen, T. K. (2014). Giving a voice to traumatized youth—experiences with trauma-focused cognitive behavioral therapy. *Child Abuse & Neglect*, *38*(7), 1221–1230. https://doi.org/10.1016/j.chiabu.2013.11.008

Domhardt, M., Geßlein, H., von Rezori, R. E., & Baumeister, H. (2019). Internet- and mobile-based interventions for anxiety disorders: A meta-analytic review of intervention components. *Depression and Anxiety*, *36*(3), 213–224. https://doi.org/10.1002/da.22860

Donkin, L., & Glozier, N. (2012). Motivators and motivations to persist with online psychological interventions: A qualitative study of treatment completers. *Journal of Medical Internet Research*, *14*(3), e91. https://doi.org/10.2196/jmir.2100

Dorsey, S., Briggs, E. C., & Woods, B. A. (2011). Cognitive-behavioral treatment for posttraumatic stress disorder in children and adolescents. *Child and Adolescent Psychiatric Clinics of North America*, *20*(2), 255–269. https://doi.org/10.1016/j.chc.2011.01.006

Doukani, A., Quartagno, M., Sera, F., Free, C., Kakuma, R., Riper, H., Kleiboer, A., Cerga-Pashoja, A., van Schaik, A., Botella, C., Berger, T., Chevreul, K., Matynia, M., Krieger, T., Hazo, J.-B., Draisma, S., Titzler, I., Topooco, N., Mathiasen, K., … Araya, R. (2024). Comparison of the working alliance in blended cognitive behavioral therapy and treatment as usual for depression in Europe: Secondary data analysis of the E-COMPARED randomized controlled trial. *Journal of Medical Internet Research*, *26*(1), e47515. https://doi.org/10.2196/47515

Eastwood, O., Peters, W., Cohen, J., Murray, L., Rice, S., Alvarez-Jimenez, M., & Bendall, S. (2021). Like a huge weight lifted off my shoulders": exploring young peoples' experiences of treatment in a pilot trial of trauma-focused

cognitive behavioral therapy. *Psychotherapy Research*, *31*(6), 737–751. doi:10.1080/10503307.2020.1851794.

Ebert, D. D., Berking, M., Cuijpers, P., Lehr, D., Pörtner, M., & Baumeister, H. (2015). Increasing the acceptance of internet-based mental health interventions in primary care patients with depressive symptoms. A randomized controlled trial. *Journal of Affective Disorders*, *176*, 9–17. https://doi.org/10.1016/j.jad.2015.01.056

Ehlers, A., Wild, J., Warnock-Parkes, E., Grey, N., Murray, H., Kerr, A., Rozental, A., Thew, G., Janecka, M., Beierl, E. T., Tsiachristas, A., Perera-Salazar, R., Andersson, G., & Clark, D. M. (2023). Therapist-assisted online psychological therapies differing in trauma focus for post-traumatic stress disorder (STOP-PTSD): A UK-based, single-blind, randomised controlled trial. *The Lancet Psychiatry*, *10*(8), 608–622. https://doi.org/10.1016/S2215-0366(23)00181-5

Ellinghaus, C., Truss, K., Liao Siling, J., Phillips, L., Eastwood, O., Medrano, C., & Bendall, S. (2021). "I'm tired of being pulled from pillar to post": A qualitative analysis of barriers to mental health care for trauma-exposed young people. *Early Intervention in Psychiatry*, *15*(1), 113–122. https://doi.org/10.1111/eip.12919

Galovski, T. E., Nixon, R. D. V., & Kehle-Forbes, S. (2024). Walking the line between fidelity and flexibility: A conceptual review of personalized approaches to manualized treatments for posttraumatic stress disorder. *Journal of Traumatic Stress*, *37*(5), 768–774. https://doi.org/10.1002/jts.23073

Harvey, M. R. (2000). In the aftermath of sexual abuse: Making and remaking meaning in narratives of trauma and recovery. *Narrative Inquiry*, *10*(2), 291–311. https://doi.org/10.1075/ni.10.2.02har

IBM Corp. (2017). *IBM SPSS statistics for windows* [Software]. Armonk.

ISTSS Guidelines Committee. (2019). *ISTSS PTSD prevention and treatment guidelines methodology and recommendations*. International Society for Traumatic Stress Studies.

Karyotaki, E., Efthimiou, O., Miguel, C., Maas genannt Bermpohl, F., Furukawa, T. A., Cuijpers, P., & Individual Patient Data Meta-Analyses for Depression (IPDMA-DE) Collaboration. (2021). Internet-Based cognitive behavioral therapy for depression: A systematic review and individual patient data network meta-analysis. *JAMA Psychiatry*, *78*(4), 361–371. https://doi.org/10.1001/jamapsychiatry.2020.4364

Koelen, J., Klein, A., Wolters, N., Bol, E., Koning, L. D., Roetink, S., Blom, J. V., Boutin, B., Schaaf, J., Grasman, R., der Heijde, C. M. V., Salemink, E., Riper, H., Karyotaki, E., Cuijpers, P., Schneider, S., Rapee, R., Vonk, P., & Wiers, R. (2024). Web-based, human-guided, or computer-guided transdiagnostic cognitive behavioral therapy in university students with anxiety and depression: Randomized controlled trial. *JMIR Mental Health*, *11*(1), e50503. https://doi.org/10.2196/50503

Kuester, A., Niemeyer, H., & Knaevelsrud, C. (2016). Internet-based interventions for posttraumatic stress: A meta-analysis of randomized controlled trials. *Clinical Psychology Review*, *43*, 1–16. https://doi.org/10.1016/j.cpr.2015.11.004

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, *33*(1), 159–174. https://doi.org/10.2307/2529310

Lewis, C., Roberts, N. P., Simon, N., Bethell, A., & Bisson, J. I. (2019). Internet-delivered cognitive behavioural therapy for post-traumatic stress disorder: Systematic review and meta-analysis. *Acta Psychiatrica Scandinavica*, *140*(6), 508–521. https://doi.org/10.1111/acps.13079

Lyons, N., Cooper, C., & Lloyd-Evans, B. (2021). A systematic review and meta-analysis of group peer support interventions for people experiencing mental health conditions. *BMC Psychiatry*, *21*(1), 315. https://doi.org/10.1186/s12888-021-03321-z

Mayring, P. (2015). *Qualitative Inhaltsanalyse: Grundlagen und Techniken (11., aktualisierte und überarbeitete Auflage)*. Beltz.

Midgley, N., Ansaldo, F., & Target, M. (2014). The meaningful assessment of therapy outcomes: Incorporating a qualitative study into a randomized controlled trial evaluating the treatment of adolescent depression. *Psychotherapy*, *51*(1), 128–137. https://doi.org/10.1037/a0034179

Musiat, P., Johnson, C., Atkinson, M., Wilksch, S., & Wade, T. (2022). Impact of guidance on intervention adherence in computerised interventions for mental health problems: A meta-analysis. *Psychological Medicine*, *52*(2), 229–240. https://doi.org/10.1017/S0033291721004621

Neelakantan, L., Hetrick, S., & Michelson, D. (2019). Users' experiences of trauma-focused cognitive behavioural therapy for children and adolescents: A systematic review and metasynthesis of qualitative research. *European Child & Adolescent Psychiatry*, *28*(7), 877–897. https://doi.org/10.1007/s00787-018-1150-z

Pfeiffer, S., & In-Albon, T. (2022). Barriers to seeking psychotherapy for mental health problems in adolescents: A mixed method study. *Journal of Child and Family Studies*, *31*(9), 2571–2581. https://doi.org/10.1007/s10826-022-02364-4

Phelps, A. J., Lethbridge, R., Brennan, S., Bryant, R. A., Burns, P., Cooper, J. A., Forbes, D., Gardiner, J., Gee, G., Jones, K., Kenardy, J., Kulkarni, J., McDermott, B., McFarlane, A. C., Newman, L., Varker, T., Worth, C., & Silove, D. (2022). Australian guidelines for the prevention and treatment of posttraumatic stress disorder: Updates in the third edition. *Australian & New Zealand Journal of Psychiatry*, *56*(3), 230–247. https://doi.org/10.1177/00048674211041917

Plaistow, J., Masson, K., Koch, D., Wilson, J., Stark, R. M., Jones, P. B., & Lennox, B. R. (2014). Young people's views of UK mental health services. *Early Intervention in Psychiatry*, *8*(1), 12–23. https://doi.org/10.1111/eip.12060

Pynoos, R. S., Weathers, F. W., Steinberg, A. M., Marx, B. P., Layne, C. M., Kaloupek, D. G., Schnurr, P. P., Keane, T. M., Blake, D. D., Newman, E., Nader, K. O., & Kriegler, J. A. (2015). Clinician-Administered PTSD Scale for DSM-5—Child/adolescent version. In Ptsd.va.gov.

Rosner, R., Barke, A., Albrecht, B., Christiansen, H., Ebert, D. D., Lechner-Meichsner, F., Muche, R., Zarski, A. C., & Steil, R. (2020). BEST FOR CAN – bringing empirically supported treatments to children and adolescents after child abuse and neglect: Study protocol. *European Journal of Psychotraumatology*, *11*(1), 1837531. https://doi.org/10.1080/20008198.2020.1837531

Rosner, R., Gutermann, J., Landolt, M. A., Plener, P., & Steil, R. (2020). Die neue S3-Leitlinie Posttraumatische Belastungsstörung (PTBS). *Trauma & Gewalt*, *14*(2), 132–142. https://doi.org/10.21706/tg-14-2-132

Sachser, C., Berliner, L., Risch, E., Rosner, R., Birkeland, M. S., Eilers, R., Hafstad, G. S., Pfeiffer, E., Plener, P. L., & Jensen, T. K. (2022). The child and adolescent trauma screen 2 (CATS-2) – Validation of an instrument to

measure DSM-5 and ICD-11 PTSD and complex PTSD in children and adolescents. *European Journal of Psychotraumatology*, *13*(2), 2105580. https://doi.org/10.1080/20008066.2022.2105580

Salloum, A. (2019). Dissemination and implementation of evidence-based treatments for childhood PTSD. In L. J. Farrell, T. H. Ollendick, & P. Muris (Eds.), *Innovations in CBT for childhood anxiety, OCD, and PTSD* (pp. S. 715–730). Cambridge University Press. https://doi.org/10.1017/9781108235655.035.

Sandelowski, M. (2001). Real qualitative researchers do not count: The use of numbers in qualitative research. *Research in Nursing & Health*, *24*(3), 230–240. https://doi.org/10.1002/nur.1025

Schnyder, U., Ehlers, A., Elbert, T., Foa, E. B., Gersons, B. P. R., Resick, P. A., Shapiro, F., & Cloitre, M. (2015). Psychotherapies for PTSD: What do they have in common? *European Journal of Psychotraumatology*, *6*. https://doi.org/10.3402/ejpt.v6.28186

Schröder, J., Sautier, L., Kriston, L., Berger, T., Meyer, B., Späth, C., Köther, U., Nestoriuc, Y., Klein, J. P., & Moritz, S. (2015). Development of a questionnaire measuring attitudes towards psychological online interventions-the APOI. *Journal of Affective Disorders*, *187*, 136–141. https://doi.org/10.1016/j.jad.2015.08.044

Schueller, S. M., Tomasino, K. N., & Mohr, D. C. (2017). Integrating human support into behavioral intervention technologies: The efficiency model of support. *Clinical Psychology: Science and Practice*, *24*(1), 27–45. https://doi.org/10.1037/h0101740

Schulte, C., Harrer, M., Sachser, C., Weiss, J., & Zarski, A.-C. (2024). Internet- and mobile-based psychological interventions for post-traumatic stress symptoms in youth: A systematic review and meta-analysis. *NPJ Digital Medicine*, *7*(1), 1–10. https://doi.org/10.1038/s41746-024-01042-7

Schulte, C., Sachser, C., Rosner, R., Ebert, D. D., & Zarski, A.-C. (2024). Feasibility of a trauma-focused internet- and mobile-based intervention for youth with posttraumatic stress symptoms. *European Journal of Psychotraumatology*, *15*(1), 2364469. https://doi.org/10.1080/20008066.2024.2364469

Schulte, C., Zarski, A.-C., Sachser, C., Rosner, R., & Ebert, D. D. (2022). Internet- and mobile-based trauma-focused intervention for adolescents and young adults with post-traumatic stress disorder: A study protocol of a proof-of-concept feasibility study. *European Journal of Psychotraumatology*, *13*(2), 2101345. https://doi.org/10.1080/20008198.2022.2101345

Sekhon, M., Cartwright, M., & Francis, J. J. (2017). Acceptability of healthcare interventions: An overview of reviews and development of a theoretical framework. *BMC Health Services Research*, *17*(1), 88. https://doi.org/10.1186/s12913-017-2031-8

Siddaway, A. P., Meiser-Stedman, R., Chester, V., Finn, J., Leary, C. O., Peck, D., & Loveridge, C. (2022). Trauma-focused guided self-help interventions for posttraumatic stress disorder: A meta-analysis of randomized controlled trials. *Depression and Anxiety*, *39*(10-11), 675–685. https://doi.org/10.1002/da.23272

Simon, N., Lewis, C. E., Smallman, K., Brookes-Howell, L., Roberts, N. P., Kitchiner, N. J., Ariti, C., Nollett, C., McNamara, R., & Bisson, J. I. (2023). The acceptability of a guided internet-based trauma-focused self-help programme (spring) for post-traumatic stress disorder (PTSD). *European Journal of Psychotraumatology*, *14*(2), 2212554. https://doi.org/10.1080/20008066.2023.2212554

Skinner, H. K., Rahtz, E., & Korszun, A. (2019). Interviews following physical trauma: A thematic analysis. *International Emergency Nursing*, *42*, 19–24. https://doi.org/10.1016/j.ienj.2018.08.004

Sommerfeld, H. (2019). *PhonerLite* [Software]. https://scholar.google.com/scholar_lookup?title=PhonerLite&author=H.%20Sommerfeld&publication_year=2019.

Tielman, M. L., Neerincx, M. A., & Brinkman, W.-P. (2019). Design and evaluation of personalized motivational messages by a virtual agent that assists in post-traumatic stress disorder therapy. *Journal of Medical Internet Research*, *21*(3), e9240. https://doi.org/10.2196/jmir.9240

Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, *19*(6), 349–357. https://doi.org/10.1093/intqhc/mzm042

VERBI Software. (2021). *MAXQDA 2022* [Software]. VERBI Software. https://www.maxqda.com/.

Zarski, A.-C., Lehr, D., Berking, M., Riper, H., Cuijpers, P., & Ebert, D. D. (2016). Adherence to internet-based mobile-supported stress management: A pooled analysis of individual participant data from three randomized controlled trials. *Journal of Medical Internet Research*, *18*(6), e146. https://doi.org/10.2196/jmir.4493