Original Articles and Reviews
Special Issue: Psychology in the Digital Age

Current State of the Art and Implications for Clinical Practice of Internet- and Mobile-Based Psychological Interventions

An EFPA Narrative Review

João Salgado[1,2,17], Marta Gomes[1,2], Márta Csabai[3,17], Tom Van Daele[4,5,17], Frank Doyle[6,17], Jonas Eimontas[7,17], Rikke Nørgaard Elster[8,9,17], David Gosar[10,11,17], Lise Haddouk[12,13,17], Maria Karekla[14,17], David Neto[15,17], and Sanda Stankovic[16,17]

[1]Department of Social and Behavioral Sciences, University of Maia, Maia, Porto, Portugal
[2]Center for Psychology, University of Porto, Porto, Portugal
[3]Karoli Gáspár University of the Reformed Church, Budapest
[4]Psychology & Technology, Centre of Expertise Care and Well-Being, Thomas More University of Applied Sciences, Antwerp, Belgium
[5]Centre for Technological Innovation, Mental Health and Education, Queen's University Belfast, Belfast, United Kingdom
[6]Department of Health Psychology, School of Population Health, RCSI University of Medicine and Health Sciences, Ireland
[7]Department of Clinical Psychology, Institute of Psychology, Faculty of Philosophy, Vilnius University, Lithuania
[8]Let's Talk About Tou, Copenhagen, Denmark
[9]Danish Psychological Association, Copenhagen, Denmark
[10]Department of Child, Adolescent and Developmental Neurology, University Children's Hospital Ljubljana, University Medical Center Ljubljana, Slovenia
[11]Department of Psychology, Faculty of Arts, University of Ljubljana, Slovenia
[12]Department of Psychology, Université de Rouen, France
[13]Centre Borelli (UMR9010); Université Paris Cité, ENS Paris Saclay, CNRS, INSERM, SSA, Paris, France
[14]Department of Psychology, University of Cyprus, Nikosia, Cyprus
[15]APPsyCI – Applied Psychology Research Center Capabilities & Inclusion, ISPA – Instituto Universitário, Lisbon, Portugal
[16]LIRA Lab, Department of Psychology, Faculty of Philosophy, University of Belgrade, Serbia
[17]Member of Standing Committee of Psychology in Health, European Federation of Psychologists' Association, Brussels, Belgium

Abstract: In 2018, the European Federation of Psychologists' Associations (EFPA) published a report summarising the evidence on Internet- and mobile-based psychological interventions (IMIs) for the prevention and treatment of mental health disorders. Given the rapid developments in this field, an updated narrative review was conducted to provide a broad overview of the literature addressing multiple perspectives on the use of IMIs. The review outlines the definition, types, purposes, and current evidence of IMIs; examines the emerging role of AI; and discusses practical considerations, including limitations and challenges (e.g., adverse effects, legal and ethical issues), implementation barriers, inequalities and inclusion, and their current use in routine care. Results across these domains paint a nuanced picture, summarising the potential as well as the pitfalls of IMIs. In the discussion, key conclusions emerge: IMIs that include therapist guidance tend to achieve higher adherence and more reliable clinical outcomes, while matching support to users' needs is crucial for scalability. Tailoring content and sustaining engagement are critical determinants of success. Effective implementation of IMIs requires careful attention to ethical concerns and thoughtful integration of AI. Practical barriers, such as limited access and the digital divide, must also be addressed to ensure these interventions are adopted fairly and equitably. Overcoming these challenges will require continued cooperation among researchers, clinicians, users, policymakers, and IT stakeholders.

Keywords: Internet-and-mobile-based interventions, mental health disorders, artificial intelligence, implementation

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

In 2018, the European Federation of Psychologists' Associations (EFPA) e-health taskforce published a report on internet- and mobile-based psychological interventions (IMIs), which provided an overview and summarized evidence regarding the use and efficacy of IMIs for the prevention and treatment of mental health disorders (Ebert et al., 2018). Over the past few years, particularly accelerated by the COVID-19 pandemic, the field of digital mental health has seen exponential growth and transformation, accelerating its adoption and reinforcing its role in mental health care. Consequently, the use of IMIs, whether as supplementary or stand-alone interventions, became more common (Sorkin et al., 2021; Wang et al., 2023).

Research findings over the past 5 years have reinforced the efficacy of IMIs in various psychological domains, expanding the evidence base for a wide range of mental health conditions (De Witte et al., 2021). Emerging technologies have also significantly transformed the landscape of IMIs. Artificial intelligence (AI) and machine learning (ML) are now being integrated to tailor interventions based on individual user data, thereby enhancing personalization and engagement. AI-driven chatbots can provide immediate support and psychoeducation, while advanced analytics enable IMIs to adapt in real time to users' needs and progress (Gutierrez et al., 2024). Wearable technology and smartphone sensors' integration have expanded IMIs' capabilities, allowing for passive data collection on behavior and physiological states, which can be used to deliver timely interventions and track changes over time (Konstantinou, et al., 2020; Niemeijer et al., 2022). Although the evidence base for the added value above "conventional" IMIs remains limited to date, these innovations have the potential to make IMIs more interactive, responsive, and accessible.

The policy and regulatory landscape also evolved, as governments and health organizations worldwide increasingly recognize the importance of digital mental health solutions. At the same time, ethical challenges arise, including privacy issues, an increasing number of publicly available non-evidence-based IMIs, and inequities in terms of IMIs' reach. Facilitators, barriers to engagement, and strategies for implementing IMIs in real-life settings become increasingly important, as sustained engagement has been challenging to achieve (Karekla et al., 2019).

Therefore, given this growing literature, new evidence, the integration of adjacent technologies, and novel challenges, an update to the original EFPA report was warranted to ensure the reflection of the current state-of-the-art. In a preparatory initial meeting, the members of the EFPA Health Psychology Standing Committee that volunteered to this task of updating the previous report, discussed these developments and reached a consensus about the aims and the main topics to be addressed: a brief overview of IMIs definition and varieties; the different forms of therapist involvement; the main purposes and current evidence base; the impact of AI on IMIs; privacy, legal and ethical challenges; and questions regarding the implementation of IMIs.

Review Approach

To perform this review, we followed a narrative approach aimed at offering a broad and updated synthesis of the literature on IMIs. Rather than applying a systematic selection protocol, we conducted targeted searches in databases such as PubMed, PsycINFO, Web of Science and Scopus between September 2024 and March 2025. Key search terms included combinations such as "internet-based interventions" OR "mobile-based interventions" OR "internet- and mobile-based psychological interventions" OR "e-mental health" OR "digital mental health" AND ("effectiveness" OR "evidence base" OR "AI integration" OR "ethical issues" OR "implementation" OR "therapist involvement" OR "privacy"). Boolean operators and wildcards (e.g., "AI in mental health*") were used to refine results. Relevant reviews and empirical studies published between 2018 and 2024 were prioritized. Although no language restrictions were applied, all included publications were in English.

Inclusion criteria emphasized relevance to the consensus topics identified by the EFPA Health Psychology Standing Committee, favouring peer-reviewed reviews, empirical studies (e.g., RCTs, observational), and conceptual papers. Exclusion criteria omitted nonpsychological digital interventions, pre-2018 sources (unless of particular significance), and low-rigor materials (e.g., non-referenced blogs). Additional sources were identified through backward citation tracking and expert consultation.

Searches retrieved a few thousand records across databases. A targeted screening of relevant sources resulted in 97 included references: 34 systematic reviews/meta-analyses, 8 umbrella/scoping reviews, 29 empirical studies, 16 conceptual/ethical papers, 2 consensus/policy reports, and 8 guidelines. This process ensured comprehensive coverage while accommodating the field's interdisciplinary and rapidly evolving nature.

Characterizing Internet- and Mobile-Based Interventions

The field of IMIs has developed very quickly, with an abundance of different approaches, methods, and techniques. The result is a heterogeneous field that has given rise to a profuseness of inconsistently used terms. Smoktunowicz et al. (2020) identified 45 different terms, varying from

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

"chat treatment" to "teletherapy", to refer to psychological, behavioral and self-help interventions, and propose that a task force should be created to devise a standard glossary as a potential remedy for this state of affairs.

We will stick with the definition from Andersson (2018), who defined "internet interventions" as psychosocial interventions mediated by the internet that aim to prevent or treat mental health problems. We will only slightly expand this umbrella-like definition by also including mobile, as an increasing amount of internet interventions are no longer delivered through desktop computers but rely on mobile technology, i.e. smartphones.

In this paper, in line with the previous EFPA report (Ebert et al., 2018), we decided to exclude synchronous telepsychology, i.e., live, real-time video or audio interaction. The rationale for this decision was that this type of intervention – where a psychologist conducts a session remotely – represents a field on its own, with more overlap with the traditional format of face-to-face therapy. Similarly, other technologies, such as immersive technologies (e.g., virtual and augmented reality) or social media, also show promise (De Witte et al., 2021) but are considered out of scope for this report.

Varieties of Therapist Involvement

IMIs typically combine a technological component with a specific therapeutic or support framework, allowing them to either enhance face-to-face services or serve as standalone solutions. In terms of therapist involvement, IMIs include unguided, guided, and blended interventions, each with varying levels of interaction and human support.

Unguided Interventions

Unguided interventions refer to self-help IMIs that users can access independently and progress through at their own pace. These interventions involve no contact with or support from professionals, allowing users to navigate the content autonomously. Structured modules and tools are often included to facilitate learning and skill development, providing a flexible and accessible approach to mental health support and self-improvement. However, they sometimes lack therapeutic depth and adequate risk management (Bubolz et al., 2020; Crosby & Bonnington, 2020) and may be associated with limited treatment adherence (Baumel et al., 2019; Woolley et al., 2024).

Guided Interventions

Guided self-help interventions are a widely used format that provides structured, evidence-based content for users to engage with independently. While users complete most tasks on their own, these interventions also include professional support, such as progress monitoring, personalized feedback, and guidance. This combination of self-directed activities and expert input helps users stay on track and enhances their overall engagement with the program or app (Andersson, 2016).

Blended Interventions

IMIs come with challenges, even in a guided format, including the need for digital literacy, self-reflection skills, and potential difficulties in handling crises due to the lack of nonverbal cues. These limitations often make them more suitable for milder mental health issues. To balance the benefits and drawbacks of both approaches, an integrated form has been developed named "blended" treatments or interventions (Erbe et al., 2017) that combines face-to-face psychotherapy with IMIs. Rather than replacing direct interaction with the therapist, blended interventions aim to optimize the benefits of traditional psychological treatment with the flexibility and accessibility technology offers. Blended treatments have the potential to reduce the costs of mental health care by shortening treatment duration and reducing the need for extensive therapist contact (Kooistra et al., 2016), and to expand IMIs to more severe conditions (Ehrt-Schäfer et al., 2023), even if more research in these areas is needed.

Current Evidence Regarding the Degree of Therapist Involvement

Given these varieties of delivering IMIs, one pertinent question concerns the effects each has under different conditions and contexts of application. The findings support that, in general, IMIs work better with guidance, but it also depends on the specific intervention and population. Moreover, there is not enough research based on direct comparisons between guided and unguided interventions to answer this question definitively.

In a systematic review and meta-analysis on Internet-delivered Cognitive behavior therapy (iCBT) for depression by Karyotaki et al. (2021), the average adherence was 76% for guided iCBT and 54% for unguided iCBT, highlighting the potential for human support to improve the impact of IMIs, particularly for individuals with greater symptom severity. The umbrella review by Zhang et al. (2024) also found that guided IMIs led to better treatment adherence, a finding echoed by Käll et al. (2024), who noted that therapist-guided iCBT was associated with steeper symptom reductions in anxiety and higher effect sizes for different conditions. Nevertheless, unguided iCBT was still effective for disorders such as depression, insomnia, and social anxiety, while not yielding significant benefits for PTSD, suggesting that certain conditions may require more

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

structured therapeutic support. However, the lack of direct head-to-head trials limits definitive conclusions about the relative efficacy of the two approaches. Future research should prioritize well-powered studies that compare guided and unguided interventions across different psychiatric conditions to determine where therapist involvement is most crucial.

Furthermore, the comparison between highly trained mental health professionals (e.g., clinicians) and paraprofessional-level (e.g., students or non-clinicians) supporters suggests that advanced clinical training is not a prerequisite for providing effective human support (Werntz et al., 2023). Studies that have included professional guidance and engagement reminders (e.g., supportive text messages, calls, personalized feedback) along with smartphone apps have also shown larger effect sizes on mental health outcomes compared to those that do not (Karyotaki et al., 2017; Linardon et al., 2019).

Main Purposes and Current Evidence Base

The multifaceted nature of IMIs is reflected in their use throughout the continuum of intervention. They have been successfully applied to the promotion and prevention of mental health, treatment, recovery and relapse prevention of mental health difficulties, and management of chronic conditions.

Promotion and Prevention

The potential benefits of IMIs in an early stage or prior to the development of a mental health disorder are evident, since the internet allows the opportunity to scale up interventions to entire populations. The research in this area is still scarce compared to interventions, but the empirical results obtained up to now seem to endorse the positive expectations. In a meta-analysis, Sander et al. (2016) found moderate to small effect sizes of programs aiming at preventing depression, anxiety, and eating disorders, while a more recent meta-analysis by Noh and Kim (2023) showed stronger evidence for benefits of this kind of program directed to adolescents when aiming at depression, but not as much for anxiety or stress.

College students have also been targeted frequently by IMIs. Lattie et al. (2018), in a systematic review, retrieved 89 studies on IMIs for depression, anxiety, and enhancement of psychological well-being in college students. Although many of those studies were treatment intervention programs, 36 were universal prevention programs. They found that over 70% of the studies were either effective or partially effective in affecting the outcome variables. Keeping users motivated is particularly challenging when offering preventive IMIs. Saleem et al. (2021) conducted a scoping review of mental health promotion IMIs with specific engagement strategies. They found that personalized support during the intervention, access to social support, and personalized feedback fostered adherence.

Treatment

The most common format of IMIs are treatment protocols addressing specific mental health problems, such as depression, anxiety, stress, or other mental health issues. Most of the time, these IMIs involve an online treatment platform by which the client accesses the treatment. Gradually, these treatment platforms have become accessible not only by a webpage, but more and more with mobile apps, by which clients (and therapists) may access the treatment. Contrasting with face-to-face teletherapy, these treatments typically do not require any synchronous encounter with a therapist; rather, the person is asked to interact autonomously with the platform. The specific features of these treatments vary, but they always have specific contents (in different formats, such as text, graphics, photos, audio, or video files), guiding the person through the platform and proposing activities aimed at intervening in specific issues (e.g., behavioral activation). These platforms may also include assessment procedures, such as self-report measures or even ecological momentary assessments that may be used to monitor the client's progress. They may also allow communication between the clinician/researcher and the client.

Given the growing interest and demand for digital mental health solutions, researchers continue to investigate their effectiveness across different psychiatric and somatic conditions, and nowadays, there is an impressive proliferation not only of studies but also of systematic reviews and meta-analyses. Given this overall scenario, we thus opted to highlight two recent umbrella reviews aimed at assessing the overall effectiveness of IMIs, the role of therapist guidance, and the challenges related to dropout rates and long-term adherence.

A recent large umbrella review of 87 meta-analyses assessing the effectiveness of IMIs (encompassing interventions based on phone/short message service support, applications, social media and websites), covering 1683 randomized controlled trials (RCTs) and 295,589 patients, found a great variety of mental health problems addressed, namely depression, anxiety disorders, addiction, PTSD, suicidal ideation, stress, obsessive-compulsive disorder, and various personality disorders (Zhang et al., 2024). Another umbrella review of 39 meta-analyses of iCBT delivered in an asynchronous manner via either a web platform or an app covered interventions addressing varying difficulties, such as depression, anxiety, suicidal ideation, grief after bereavement, stress, eating disorders, somatic disorders, and sleep (Käll et al., 2024).

Regarding the type of intervention, the most common model used is the cognitive-behavioral, but Zhang et al.

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

(2024) specified different kinds of models in which these treatments are based, such as behavioral activation, exposure therapy, problem-solving therapy, dialectical behavior therapy, interpersonal therapy, psychodynamic therapy, supportive therapy, social skills training, acceptance and commitment therapy (ACT), mindfulness therapy, cognitive remediation therapy, cognitive training, psychoeducation, attentional bias modification, motivational interviewing, internet-based trauma-focused writing sessions, person-centred therapy, exposure and response prevention, motivational enhancement therapy and behavioral couple therapy.

When considering all these kinds of types of interventions, IMIs showed significant effects, varying from moderate effect sizes in treating anxiety disorders (*SMD* = 0.53) and post-traumatic stress disorder (PTSD) (*SMD* = 0.63), to smaller effects for depression (*SMD* = 0.45), stress (*SMD* = 0.41, 95%), OCD (*SMD* = 0.47), suicidal ideation (*SMD* = 0.23), and addiction (*SMD* = 0.23), while no significant effects were observed for personality disorders (Zhang et al., 2024).

The umbrella review by Käll et al. (2024) found that iCBT was generally effective in reducing symptoms of depression and anxiety, though effect sizes were slightly smaller than in previous reviews. One possible explanation for this result is the wider application in milder situations, such as stress in the workplace, which may have created a ceiling effect. The review also reported effects of iCBT across various target groups, with outcomes ranging from small effects (e.g., *SMD* = 0.10 for stress among employees) to large effects (e.g., *SMD* = 1.20 for depressive symptoms among older adults). Additionally, the review expanded the scope of iCBT efficacy to include conditions such as tinnitus, chronic pain, and workplace mental health interventions, showing relevant effects. However, it also highlighted a lack of robust evidence for psychotic disorders and the need for more methodologically rigorous meta-analyses.

One of the persistent challenges associated with IMIs and iCBT is the issue of dropout rates. The general umbrella review by Zhang et al. (2024) emphasized that high dropout rates impacted the overall effectiveness of IMIs, with unguided interventions being particularly prone to attrition. These findings highlight the importance of engagement strategies in digital mental health interventions, especially concerning a priori theoretical planning, Human-computer Interaction, Tailoring and targeting to user groups, and Active assessment of usage (Karekla et al., 2019; Kasinopoulos et al., 2023). Studies suggest that personalized reminders, interactive content, and blended care approaches (combining digital therapy with in-person support) may enhance adherence (Linardon et al., 2019; Torous et al., 2020). The need for patient engagement strategies is particularly relevant for conditions such as depression and addiction, where dropout rates tend to be higher.

Blended interventions represent a promising avenue for optimizing digital mental health treatments. Studies have found that blended iCBT for depression and anxiety is as effective as in-person therapy, with comparable therapeutic alliance ratings (Preschl et al., 2011; Kooistra et al., 2016). Moreover, therapist efficiency can be improved by using IMIs to reduce the number of required face-to-face sessions. For example, (Clark et al. 2023) found that iCBT achieved similar clinical outcomes while requiring only half the therapist's time, allowing clinicians to treat more patients within the same timeframe.

The current state of research on the cost-effectiveness of IMIs for mental health problems is promising but mixed, with several studies indicating potential benefits and others highlighting the need for further research. Internet interventions for mental health disorders, such as depression and anxiety, have shown favorable cost-effectiveness compared to traditional care, even if the results are still modest. A first meta-analysis on this topic (Rohrbach et al., 2023) found that these interventions were slightly more effective when compared with a do-nothing or care-as-usual approach, while a previous systematic review (Mitchell et al., 2021) indicated that 81% of internet interventions for anxiety and depression were cost-effective, although the studies varied in methodology and cost components. Moreover, guided internet interventions have stronger support in terms of cost-effectiveness than unguided ones (Kählke et al., 2022), even if there are studies showing that self-guided IMIs are most cost-effective in pain management (e.g., Dear et al., 2021). Thus, it seems that we need to be cautious and to avoid a one-size-fits-all answer to this question about the preferred mode of support when using IMIs. Much more research is needed in this area, sensitive to the specificities of the intervention and target groups. Another potential focus for IMIs is on maintaining recovery and relapse prevention. Mental health conditions have a high relapse rate, and any significant effect in reducing or delaying relapse is very impactful. A review of 16 RCTs found a small to medium effect on symptom severity in several mental health disorders (Hennemann et al., 2018). Most considered interventions were CBT-based for depression, eating disorders and transdiagnostic treatments.

Artificial Intelligence and Impact on IMIs

The use of artificial intelligence (AI) and machine learning (ML), which represents a subset of methods within the field of AI, is providing new opportunities in terms of mental

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

health assessment, prevention, and promotion. The last decade has seen an ever-increasing use of ML for improving the prediction of clinical outcomes such as suicide (Burke et al., 2019), psychosis onset (Rezaii et al., 2019), postpartum depression (Saqib et al., 2021), treatment outcomes (Del Fabro et al., 2023), based on relevant risk and protective factors as well as more advanced digital and biochemical markers (Khoo et al., 2024). As the assessment of psychological processes has become more complex and has begun incorporating daily measures of symptoms of psychopathology (Wenzel et al., 2024), digital traces of human behavior (Bufano et al., 2023) and different wearable sensors (Gomes et al., 2023) to measure behavior, ML has for many become the go-to method for integrating this type of complex data into useful predictive models (Nguyen et al., 2023). More recently, the advent of large language models has given impetus for developing ML tools that harness the richness and depth of the human language, the use of complex language in online chatbots for mental health (Gallegos et al., 2024), and the assessment of psychological constructs using natural language (Kjell et al., 2024).

The advent of modern ML methods, including deep learning and large language models, has also contributed to societal change, both within society generally and within psychology more specifically. The use of ML within the context of crowd-sourced therapy is an example of the use of ML to promote greater involvement of individuals with lived experience of mental health issues and the development of mental health interventions. In an experiment conducted at the Michigan Institute of Technology (Rojas-Barahona et al., 2018), patients and therapists alike were invited to contribute ideas about the most helpful ways of restructuring specific negative automatic thoughts. As such proposals accrued, patients rated these suggestions and, in time, developed a database that could be used to train an ML model. This ML model then provided the backend for a mental health chatbot created by a community of patients and therapists. Examples such as these not only indicate that ML has the potential to make the mental health field more inclusive for people with lived experience but also show that it has the potential to upscale mental health interventions. More generally, building on the conceptual framework put forth by proponents of Process-Based Therapy (PBT), ML can help take advantage of the empirical data on the mediators and moderators in psychotherapy by tailoring it to the individual, thereby potentially increasing its impact, ensuring greater engagement, and extending its reach (Ciarrochi et al., 2024).

However, the use of ML in mental health also faces multiple and significant hurdles. As a recent review documented (Gutierrez et al., 2024), most researchers in the mental health field do not abide by the reporting standards set forth by the ML community (Collins et al., 2024; Kapoor et al., 2024). In addition, very few authors and ML developers provided evidence of the validity of their models in independent test sets not used to train and fine-tune their ML models. This is vital since the lack of such validation methods can lead to a significant overestimation of a model's accuracy. Furthermore, depending on the datasets used for training and model refinement, it can lead to bias in terms of gender, age, socio-economic status and/or race, with significant ethical implications for underserved communities. These issues have also been highlighted in recent EU legislation (EU AI Act – Regulation (EU) 2024/1689). Psychological applications of AI tools designated by the EU as medical devices and AI systems geared toward psychological assessment (e.g., AI systems intended to be used allocate tasks based on individual behavior or personal traits or to be used by public authorities to evaluate the eligibility of persons for essential public assistance benefits and services, including healthcare) are considered by the EU AI Act to be high-risk AI systems, with potential to adversely impact the fundamental rights of individuals. Such AI systems therefore require special provisions to ensure fairness and safety for vulnerable populations (e.g., children, people with intellectual disabilities, migrants). This is especially important with tools based on ML going from the academic research sphere to commercial application, or commercialization of ML tools without theoretical or therapeutic backing from professionals in the mental health field (Karekla et al., 2019)

Finally, one of the major hurdles in most current deep learning ML models is their opaqueness, precluding users from knowing why exactly a prediction has been made. The development of explainable artificial intelligence (XAI), aimed at developing methods to understand the workings of deep learning models post-facto (e.g., Local Interpretable Model-agnostic Explanations – LIME) (Linardatos et al., 2020; Kerz et al., 2023) seems to be one of the vital next avenues of research for using ML in the mental health field.

Privacy, Legal, and Ethical Challenges

IMIs should be used based on high-quality evidence that the intervention is adequate for the targeted population. Moreover, they need not cause harm, and we know that deterioration tends to be underreported in mental health interventions (Rozental et al., 2017). Thus, the development

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

and implementation of IMIs pose significant ethical and legal challenges. On the one hand, IMI development implies following procedures that warrant client safety and compliance with legal requirements. On the other hand, it also creates issues regarding its role compared to traditional, face-to-face forms of intervention.

The European Union (EU) has introduced several regulations to protect the privacy and health of its citizens in the digital realm. Two key frameworks are the General Data Protection Regulation (GDPR; Regulation (EU) 2016/679, 2016) which ensures individuals' rights to access and control their personal data, and the Regulation (EU) 2024/1689 (Artificial Intelligence Act, 2024), which emphasizes transparency in the use of artificial intelligence and requires human oversight in AI decision-making processes. Together, these regulations aim to uphold high standards for digital services, also within mental healthcare.

The updated EU Medical Device Regulation EU MDR; Regulation (EU) 2017/745, 2017), which came into effect in 2021, contributed to making regulations governing digital health interventions and applications more stringent. Under this regulation, a large part of IMIs, if not all, can be classified as medical devices when they are intended for diagnosis, prevention, monitoring, treatment, or alleviation of diseases, and therefore, that regulatory framework imposes rigorous standards on the development and use of healthcare technologies across the EU. If considered medical devices, under this regulation, these interventions need to obtain CE marking, demonstrating compliance with the MDR's safety and performance requirements. This involves rigorous pre-market evaluation, including clinical data and post-market surveillance.

It is a concern that this regulation could negatively affect the development of European devices, making the process complex and expensive. Outside Europe, some countries have adopted alternative approaches to encourage innovation while maintaining safety and quality standards. For example, Australia has introduced a "conditional exemption" model for digital mental health interventions, allowing developers to bypass certain regulatory hurdles while adhering to mandatory clinical guidelines. As a response to these worries, various EU member states have developed national frameworks that build on the EU MDR, such as Germany's fast-track approval process for digital health apps, France's clinical evaluation guidelines for connected medical devices, and Finland's Digital Health Technology Assessment Framework (San Miguel et al., 2022).

Despite these advances, the regulatory environment poses significant challenges for developers of digital health solutions, particularly small-scale initiatives or academic projects that lack the resources to comply with the EU MDR or achieve CE certification. This situation is exacerbated by limited funding for the costly and time-consuming accreditation process, which often hampers the transition from research to full-scale deployment of effective digital health interventions.

However, even when IMIs meet legal and regulatory standards, ethical challenges remain. Key concerns include the role of automation in healthcare, whether digital technologies should supplement or replace traditional services, how to ensure equitable access for vulnerable populations, and whether these IMIs are based on solid theoretical and empirical evidence. Increasing regulation can create friction, particularly in reaching those with limited access to digital tools. In such cases, healthcare providers may resort to using widely accessible yet insecure platforms to maintain contact with patients, raising ethical questions about prioritizing communication over privacy.

Another ethical issue regards the side effects in psychological treatments, such as worsening of symptoms, and strains in family relations (Schermuly-Haupt et al., 2018). Although the *Primum non nocere* is an integral principle of ethical psychological practice, in studies reporting IMIs, negative effects are rarely reported. Therefore, a consensus on monitoring and reporting possible negative effects of internet-delivered interventions was reached (Rozental et al., 2014). Since then, reporting of negative effects in studies on IMIs increased significantly, with a large individual patient data meta-analysis showing that the likelihood of experiencing deterioration was 3.1 times greater in the control group compared to the ICBT group (17.4% vs. 5.8%) (Rozental et al., 2017). Nonetheless, data on the negative effects of IMIs used in routine care are lacking.

Another relevant topic has to do with the potential of IMIs to replace face-to-face interventions, and how that is desirable or not. The current evidence is not enough to sustain IMIs as the best solution for some more severe conditions, and IMIs are not the best way to deal with acute crises (Torous et al., 2018). Moreover, clients may prefer face-to-face interventions, and their preferences are key elements for successfully implementing mental health interventions. Thus, giving the patients the possibility of choosing seems the best option. These preferences also need to ensure that clients receive proper explanations of questions related to privacy and confidentiality, giving full consent for the way their data will be collected, managed and used (Smith et al., 2023). Finally, while IMIs can provide access to treatment in communities that do not have access to face-to-face therapy, it is still necessary to advocate for access to all available mental health treatment options (Muñoz et al., 2018).

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

Implementation

Barriers to Implementation, Inequalities and Inclusion

Health Care Professionals' Attitudes

The implementation of IMIs always needs the collaboration of healthcare providers; as such, their attitudes are major elements that need to be considered. However, the attitudes vary with regional contexts and regulations. In Europe, for example, while a study in the UK revealed that 72% of general practitioners (GPs) used at least one e-mental health intervention for depression (Breedvelt et al., 2019), a recent survey in Portugal (Nogueira-Leite et al., 2023) revealed that only 43.6% of mental health professionals planned to recommend the use of digital means for their patients in the forthcoming 12 months, even if the most of them were favorable to such use (87.2%). It is interesting to notice that this favorable view in Portugal contrasts with a pre-pandemic national survey that showed lower acceptability of IMIs in this country (Mendes-Santos et al., 2020); in other words, the acceptance has grown following the pandemic, as expected. It is reasonable to expect that the same has happened in other countries; an increase in more favorable attitudes from the mental health professionals does not necessarily lead to wider use and implementation. In the US, for example, Kong et al. (2020) found that while many physicians were open to discussing health apps, most did not actively recommend them.

It is noteworthy, however, that the experience of wider use of IMIs does not eliminate specific concerns. The aforementioned study in the UK found that 92% of the GPs cited insufficient training as a major challenge (Breedvelt et al., 2019). The same was true in another study in New Zealand (Rawnsley & Stasiak, 2024), in which 81% of mental health clinicians reported having used digital tools, with 65% rating their knowledge as moderate or higher. While they acknowledged improved accessibility and patient empowerment, concerns remained about the digital divide and the risk of replacing traditional care. Most favored blended care and emphasized the need for secure, evidence-based, and user-friendly technologies to prevent exacerbating inequalities. The preference for blended formats was also found in a UK study by Breedvelt et al. (2019).

Győrffy et al. (2020) surveyed physicians in nine countries and found that while many saw digital tools as enhancing doctor-patient relationships, they felt patients benefited more than clinicians. They envisioned their future role as interpreters of digital data, helping patients navigate health technologies. In a comprehensive systematic review, Berardi et al. (2024) identified barriers and facilitators to adopting IMIs. Barriers include perceived impersonality, increased burden on providers and patients, and regulatory complexities, while facilitators include patient-centered approaches, evidence-based provider training, peer collaboration, and policy changes to ensure universal access.

Psychologists have also expressed the concern that while AI-powered tools may relieve some of the burdens brought on by the adoption of IMIs by helping tackle administrative tasks, increasing personalization and facilitating the interpretation of data, the use of such tools may also lead towards the deskilling of psychologists (Farmer et al., 2025). By reducing the requirements for psychologists to be familiar with the pertinent literature and to engage in critical thinking, AI-based tools could degrade professional practice standards. Using AI tools as part of IMIs without sufficient understanding of their algorithms, the data they are trained on, and the relevant field of clinical practice in which such tools are used could be professionally and ethically questionable, given that professional practice should be based on well-founded beliefs and scientific knowledge (Farmer et al., 2025).

In sum, there seems to be a tendency to accept IMIs, especially in blended formats. However, specific issues need to be addressed, and training and adequate workload seem pressing even in communities already using these devices.

Barriers and Facilitators of Engagement

Even when the initial uptake is high, obtaining long-term engagement with IMIs remains a challenge, both in RCTs and especially in real-life use, with only 3.3% of mobile app users active after 15 days (Baumel et al., 2019). A systematic review of 208 articles by Borghouts et al. (2021) highlighted common factors affecting engagement at user, program, technology, and environment levels.

Facilitators of use on the individual level range from digital literacy, positive experiences and attitudes towards technology and mental health seeking to the ease of integrating IMI into users' daily lives. Severe mental illness (SMI) can encourage interest in IMI use but also hinder sustained engagement due to symptoms (Kozelka et al., 2023).

At the program level, apart from the previously mentioned level of guidance, the type and relevance of the content are among the most robust engagement factors. Long and excessively complex content (Eccles et al., 2021) or lack of content variability (Balaskas et al., 2023) decreases engagement. Users consistently favor IMIs that offer the possibility of personalized content, tailoring it to their symptoms, preferences, etc. (Balaskas et al., 2023; Borghouts et al., 2021; Jackson et al., 2024).

On the technology level, technical issues drive users away, while intuitive and aesthetically appealing designs improve retention. Design preferences vary; some favor gamified approaches, while others prefer direct, structured

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

formats (Fleming et al., 2019). Environmental factors refer to the context of IMI implementation and may either promote its use, such as the availability of IMI training, which tends to foster adherence, or create obstacles, such as organizational and administrative barriers to engagement. Thus, these factors also need to be considered when implementing IMIs.

Often subsumed under user- or human-centric design, co-design, or participative design, involving end users in IMIs' design is considered the best way to ensure relevance and satisfactory engagement (The Wellcome Trust, 2024). However, this is still a critical issue, as most RCTs only include post hoc satisfaction surveys (Sin et al., 2020) or do not report on the method of user engagement (Bergin et al., 2020; The Wellcome Trust, 2024). Ideally, developers should aim to co-design IMIs with people with lived experience through an iterative process that starts as the first step towards designing an IMI and continues into implementation. Alternatively, end users and care providers should be included in choosing, adapting and implementing an existing IMI in a healthcare setting (Liu & Schueller, 2023). Developing a co-design approach becomes even more critical in reaching marginalized communities.

Digital Health Equity

With the rise of IMIs, the matter of equity is becoming increasingly significant. Various populations worldwide have been facing systemic inequalities in mental health, e.g., racial, ethnic and religious minorities, rural communities, low-income individuals, gender and sexual minorities, and low- and middle-income countries (WHO, 2022). IMIs are seen as a potential means to reduce these disparities by offering quality treatment regardless of physical location, costing less than face-to-face therapy, and ensuring privacy (as stigma often acts as a barrier to seeking treatment).

However, IMIs may also exacerbate inequities because of the digital divide, i.e., unequal digital access and literacy, and varying attitudes towards technology use. Digital barriers to mental health treatment often align with pre-existing social barriers, meaning paradoxically, those who are most in need of mental health intervention are often least likely to be reached by or benefit from IMIs.

Notwithstanding digital barriers, IMIs are still not meeting their potential regarding underserved communities. Promising results are available, with standard and especially with specifically designed or adapted IMIs (Piers et al., 2023; Schueller et al., 2019), but these communities are rarely the focus of IMI developers. First, data on the effectiveness of standard IMIs in marginalized groups are limited, as they are commonly not included in RCTs or sample characteristics such as ethnic identity or socioeconomic status are not reported (De Jesús-Romero et al., 2024; Kirvin-Quamme et al., 2024). Most RCTs are conducted in Western high-income countries, possibly limiting the generalisability to other countries (Karyotaki et al., 2023).

Secondly, there is a shortage of IMIs designed for or adapted for a specific community (Schueller et al., 2019). Standard IMIs are sometimes inefficient in marginalized communities (Bear et al., 2024). To be made relevant, IMIs need to include pertinent content to the lived experience of these communities, e.g., particular stressors and living situations of refugees (Spanhel et al., 2019), types of activities available to low-income and homeless people, or specific themes relevant to gender and sexual minorities. Members of ethnic minorities point to the importance of culturally appropriate and relevant content, including names, characters' backgrounds, activities, traditions, values and cultural definitions of mental health and illness (Kaihlanen et al., 2022; Piers et al., 2023; Wilson et al., 2024). Ideally, members of marginalised communities should be partners in a context-centric and collaborative design of IMIs that draw upon their expertise and agency, and should have increased power over the entire process and its outcomes (Friis-Healy et al., 2021; Kozelka, et al., 2021; Kuhn et al., 2024).

In conclusion, it is unrealistic to expect IMIs to reduce the mental health gap unless they are explicitly oriented towards equity (Kuhn et al., 2024). That means conscious, deliberate, and strategic inclusion and focus on marginalised communities (Ramos et al., 2024).

Paradoxically, those most in need of mental health intervention are often those least likely to benefit from such efforts, as evidenced by a recent review of social disparities in the use of telehealth interventions (Badr et al., 2024). Furthermore, future use of IMI's based on large language models could also entrench existing biases and stereotypes, leading to unintended adverse mental health effects of IMIs (Timmons et al., 2023).

IMIs in Routine Care

When it comes to implementation, more and more countries have public digital mental health services (e.g., Denmark, Australia, the UK, Germany, France, Sweden), where the care implemented in the clinics goes hand in hand with well-researched IMIs, as these services often consist of a research department and one or more clinics implementing the different IMIs.

In the past 10 years, a lot of private companies have entered the market of IMIs (e.g., Stoeckl et al., 2023) (for instance, HelloBetter in Germany, SilverCloud from the UK, We.Care in Denmark, BetterHelp and Talkspace in the United States, and many more). It is not always clear whether the different IMI solutions by private companies are empirically supported (Koh et al., 2022). Other important information, such as cost, privacy policy or accessibil-

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

ity, is also not readily available. In an effort to guide potential users and care personnel to accessible, safe, and effective IMIs and to help them make informed decisions, some countries have a publicly funded website that grades the publicly available IMIs, such as the mHealth Index & Navigation Database (https://mindapps.org/). This website, based on the American Psychiatric Association's App Evaluation Model, allows filtering of apps based on cost, features, privacy, supported conditions and treatment approaches and also provides information on accessibility, clinical evidence, user experience, helpfulness in emergencies, etc. However, when in need of care, a client/patient does not necessarily have the energy or mental capacity to find such a website to read about different IMIs and find the best one.

Despite lacking transparency or being empirically supported, a perspective to consider is that several private businesses providing IMIs succeeded in attracting a large number of clients and, therefore, can potentially provide large data sets. Based on these large data sets, a company would be able to calculate effect sizes and show effectiveness, for instance, to improve treatments. Since this is not always a priority or financially viable for the company, the data might not be collected thoroughly or might be left unused.

One important consideration is that IMIs are often integrated into stepped care provision of services with other types of interventions. Such integration improves the effectiveness of the overall response (e.g., Jagayat et al., 2024), harnessing the advantages of each intervention. Digital low-intensity interventions with a focus on self-management can significantly extend the capability of health services, while more intensive in-person interventions can respond to individuals with adherence issues or to those who require other types of intervention (Espie & Henry, 2023). Integrating different interventions (digital or not) according to purpose or client needs implies addressing questions other than the effectiveness of an intervention. Namely, who benefits from which interventions and what are the predictions for stepping up when the IMIs are integrated into a stepped-care approach (Nicholas et al., 2019).

General Discussion

The present review provides an updated overview of the current state of IMIs, including discussion of the latest advances, issues, and consequences for clinical practice. Over the last few years, IMIs have greatly developed, especially due to the improvement of technologies, growing evidence of effectiveness, and changing needs in society and healthcare. Since the previous EFPA report (Ebert et al., 2018), support for the efficacy of IMIs has grown markedly, although research remains concentrated on depression and anxiety, leaving several clinical areas unexplored. Moreover, marginalized groups, children and older adults are also underserved in this regard. The same can be said about therapeutic approaches. Although more diverse treatment approaches are being studied, most studies focus on CBT.

Across the literature, several recurring patterns help clarify both the strengths and limitations of IMIs and their implications for clinical practice. One consistent observation concerns the role of therapist involvement. Unguided interventions offer flexibility and scalability but often show limited therapeutic depth and low adherence, making them more suitable for prevention or for individuals with mild symptomatology when complemented by robust engagement strategies. Interventions that include some form of professional input, whether minimal or more structured, tend to produce higher adherence and more reliable clinical improvements, suggesting that even low-intensity guidance can significantly enhance outcomes while remaining feasible for routine care. Blended formats appear especially valuable for more severe or complex presentations and align well with stepped-care approaches.

A second recurring pattern relates to the intensity of support. Although current evidence is insufficient to determine the optimal level of guidance, existing findings indicate that matching support to clinical need is more important than relying exclusively on highly specialized providers, an insight with clear implications for scalability and workforce planning. Differences also emerge between interventions designed for prevention and those aimed at treatment. Preventive IMIs generally produce small-to-moderate effects, whereas treatment-focused IMIs are more established and demonstrate effectiveness across multiple disorders, despite high dropout rates and weaker outcomes for personality disorders. Across both domains, tailoring of content and sustained user engagement consistently stand out as critical determinants of success.

Another emerging trend in this field is the increasing integration of artificial intelligence into IMIs. Nonetheless, major issues such as data protection, artificial intelligence bias, and legal frameworks are still present. Additional research is therefore needed to clarify the ethical implications of using AI in psychological interventions, particularly when considering the potential involvement of intelligent agents in mental health care.

Beyond the challenges associated with AI, several broader implementation barriers persist. Distrust among healthcare professionals, together with ongoing digital divide issues, continues to limit the adoption of IMIs. Policy constraints also pose some difficulties to innovation, especially for small developers. Addressing the digital divide will require culturally appropriate and user-friendly design to

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

ensure interventions are accessible to diverse populations. Future work should also consider long-term effectiveness, conduct head-to-head comparisons between different interventions, and include cost-effectiveness analyses.

In order to overcome all these challenges, it is crucial to continue cooperation between researchers, clinicians, users, policymakers, and IT stakeholders. While there is no doubt that IMIs can already be considered as a valued resource to deal with mental health issues, in various formats, there are research and implementation challenges that must be addressed to enable a wider, large-scale use of these tools in clinical practice.

References

Andersson, G. (2016). Internet-delivered psychological treatments. *Annual Review of Clinical Psychology*, *12*(1), 157–179. https://doi.org/10.1146/annurev-clinpsy-021815-093006

Andersson, G. (2018). Internet interventions: Past, present and future. *Internet Interventions 12*, 181–188. https://doi.org/10.1016/j.invent.2018.03.008

Badr, J., Motulsky, A., & Denis, J. L. (2024). Digital health technologies and inequalities: A scoping review of potential impacts and policy recommendations. *Health Policy (Amsterdam, Netherlands)*, *146*, 105122. https://doi.org/10.1016/j.healthpol.2024.105122

Balaskas, A., Schueller, S. M., Cox, A. L., Rashleigh, C., & Doherty, G. (2023). Examining young adults daily perspectives on usage of anxiety apps: a user study. *PLOS Digital Health*, *2*(1), e0000185. https://doi.org/10.1371/journal.pdig.0000185

Baumel, A., Muench, F., Edan, S. & Kane, J. M. (2019). Objective user engagement with mental health apps: systematic search and panel-based usage analysis. *Journal of Medical Internet Research*, *21*(9), e14567. https://doi.org/10.2196/14567

Bear, H. A., Nunes, A. L., Ramos, G., Manchanda, T., Fernandes, B., Chabursky, S., Walper, S., Watkins, E., & Fazel, M. (2024). The acceptability, engagement, and feasibility of health apps for marginalized and underserved young people: systematic review and qualitative study. *Journal of Medical Internet Research*, *26*, e48964. https://doi.org/10.2196/48964

Berardi, C., Antonini, M., Jordan, Z., Wechtler, H., Paolucci, F., & Hinwood, M. (2024). Barriers and facilitators to the implementation of digital technologies in mental health systems: a qualitative systematic review to inform a policy framework. *BMC Health Services Research*, *24*(1), 243. https://doi.org/10.1186/s12913-023-10536-1

Bergin, A. D., Vallejos, E. P., Davies, E. B., Daley, D., Ford, T., Harold, G., Hetrick, S., Kidner, M., Long, Y., Merry, S., Morriss, R., Sayal, K., Sonuga-Barke, E., Robinson, J., Torous, J., & Hollis, C. (2020). Preventive digital mental health interventions for children and young people: a review of the design and reporting of research. *NPJ Digital Medicine*, *3*, 133. https://doi.org/10.1038/s41746-020-00339-7

Borghouts, J., Eikey, E., Mark, G., De Leon, C., Schueller, S. M., Schneider, M., Stadnick, N., Zheng, K., Mukamel, D., & Sorkin, D. H. (2021). Barriers to and facilitators of user engagement with digital mental health interventions: systematic review. *Journal of Medical Internet Research*, *23*(3), e24387. https://doi.org/10.2196/24387

Breedvelt, J. J., Zamperoni, V., Kessler, D., Riper, H., Kleiboer, A. M., Elliott, I., Abel, K. M., Gilbody, S., & Bockting, C. L. (2019). GPs' attitudes towards digital technologies for depression: an online survey in primary care. *The British Journal of General Practice: The Journal of the Royal College of General Practitioners*, *69*(680), e164–e170. https://doi.org/10.3399/bjgp18X700721

Bubolz, S., Mayer, G., Gronewold, N., Hilbel, T., & Schultz, J. H. (2020). Adherence to established treatment guidelines among unguided digital interventions for depression: quality evaluation of 28 web-based programs and mobile apps. *Journal of Medical Internet Research*, *22*(7). https://doi.org/10.2196/16136

Bufano, P., Laurino, M., Said, S., Tognetti, A., & Menicucci, D. (2023). Digital phenotyping for monitoring mental disorders: systematic review. *Journal of Medical Internet Research*, *25*, e46778. https://doi.org/10.2196/46778

Burke, T. A., Ammerman, B. A., & Jacobucci, R. (2019). The use of machine learning in the study of suicidal and non-suicidal self-injurious thoughts and behaviors: a systematic review. *Journal of Affective Disorders*, *245*, 869–884. https://doi.org/10.1016/j.jad.2018.11.073

Collins, G. S., Moons, K. G. M., Dhiman, P., Riley, R. D., Beam, A. L., Van Calster, B., Ghassemi, M., Liu, X., Reitsma, J. B., van Smeden, M., Boulesteix, A. L., Camaradou, J. C., Celi, L. A., Denaxas, S., Denniston, A. K., Glocker, B., Golub, R. M., Harvey, H., Heinze, G., Hoffman, M. M., … Logullo, P. (2024). TRIPOD+AI statement: updated guidance for reporting clinical prediction models that use regression or machine learning methods. *BMJ (Clinical research ed.)*, *385*, e078378. https://doi.org/10.1136/bmj-2023-078378

Ciarrochi, J., Hernández, C., Hill, D., Ong, C., Gloster, A. T., Levin, M. E., Yap, K., Fraser, M. I., Sahdra, B. K., Hofmann, S. G., & Hayes, S. C. (2024). Process-based therapy: A common ground for understanding and utilizing therapeutic practices. *Journal of Psychotherapy Integration*, *34*(3), 265–290. https://doi.org/10.1037/int0000348

Clark, D. M., Wild, J., Warnock-Parkes, E., Stott, R., Grey, N., Thew, G., & Ehlers, A. (2023). More than doubling the clinical benefit of each hour of therapist time: a randomised controlled trial of internet cognitive therapy for social anxiety disorder. *Psychological Medicine*, *53*(11), 5022–5032. https://doi.org/10.1017/S0033291722002008

Crosby, L., & Bonnington, O. (2020). Experiences and implications of smartphone apps for depression and anxiety. *Sociology of Health & Illness*, *42*(4), 925–942. https://doi.org/10.1111/1467-9566.13076

De Jesús-Romero, R., Holder-Dixon, A. R., Buss, J. F., & Lorenzo-Luaces, L. (2024). Race, ethnicity, and other cultural background factors in trials of internet-based cognitive behavioral therapy for depression: systematic review. *Journal of Medical Internet Research*, *26*, e50780. https://doi.org/10.2196/50780

De Witte, N. A. J., Joris, S., Van Assche, E., & Van Daele, T. (2021). Technological and digital interventions for mental health and wellbeing: an overview of systematic reviews. *Frontiers in Digital Health*, *3*. https://doi.org/10.3389/fdgth.2021.754337

Dear, B. F., Karin, E., Fogliati, R., Dudeney, J., Nielssen, O., Scott, A. J., Gandy, M., Bisby, M. A., Heriseanu, A. I., Hathway, T., Staples, L., Titov, N., & Schroeder, L. (2021). A cost-effectiveness analysis of an internet-delivered pain management program delivered with different levels of clinician support: Results from a randomised controlled trial. *The Journal of Pain*, *22*(3), 344–358. https://doi.org/10.1016/j.jpain.2020.11.003

Del Fabro, L., Bondi, E., Serio, F., Maggioni, E., D'Agostino, A., & Brambilla, P. (2023). Machine learning methods to predict outcomes of pharmacological treatment in psychosis. *Translational Psychiatry*, *13*(1), 75. https://doi.org/10.1038/s41398-023-02371-z

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

Ebert, D. D., Van Daele, T., Nordgreen, T., Karekla, M., Compare, A., Zarbo, C., Brugnera, A., Øverland, S., Trebbi, G., Jensen, K. L., Kaehlke, F., Baumeister, H., & Taylor, J. (2018). Internet- and mobile-based psychological interventions: applications, efficacy, and potential for improving mental health: A report of the EFPA e-health taskforce. *European Psychologist*, *23*(2), 167–187. https://doi.org/10.1027/1016-9040/a000318

Eccles, H., Nannarone, M., Lashewicz, B., Attridge, M., Marchand, A., Aiken, A., Ho, K., & Wang, J. (2021). Barriers to the use of web-based mental health programs for preventing depression: qualitative study. *JMIR Formative Research*, *5*(7), e16949. https://doi.org/10.2196/16949

Ehrt-Schäfer, Y., Rusmir, M., Vetter, J., Seifritz, E., Müller, M., & Kleim, B. (2023). Feasibility, adherence, and effectiveness of blended psychotherapy for severe mental illnesses: scoping review. *JMIR Mental Health*, *10*(1), e43882. https://doi.org/10.2196/43882

Erbe, D., Eichert, H. C., Riper, H., & Ebert, D. D. (2017). Blending face-to-face and internet-based interventions for the treatment of mental disorders in adults: systematic review. *Journal of Medical Internet Research*, *19*(9), e306. https://doi.org/10.2196/jmir.6588

Espie, C. A., & Henry, A. L. (2023). Disseminating cognitive behavioral therapy (CBT) for insomnia at scale: capitalising on the potential of digital CBT to deliver clinical guideline care. *Journal of Sleep Research*, *32*(6), e14025. https://doi.org/10.1111/jsr.14025

Farmer, R. L. Lockwood, A. B., Goforth, A., & Thomas, C. (2025). Artificial intelligence in practice: Opportunities, challenges, and ethical considerations. *Professional Psychology: Research and Practice*, *56*(1), 19–32. https://doi.org/10.1037/pro0000595

Fleming, T., Merry, S., Stasiak, K., Hopkins, S., Patolo, T., Ruru, S., Latu, M., Shepherd, M., Christie, G., & Goodyear-Smith, F. (2019). The importance of user segmentation for designing digital therapy for adolescent mental health: findings from scoping processes. *JMIR Mental Health*, *6*(5), e12656. https://doi.org/10.2196/12656

Friis-Healy, E. A., Nagy, G. A., & Kollins, S. H. (2021). It is time to REACT: opportunities for digital mental health apps to reduce mental health disparities in racially and ethnically minoritized groups. *JMIR Mental Health*, *8*(1), e25456. https://doi.org/10.2196/25456

Gallegos, C., Kausler, R., Alderden, J., Davis, M., & Wang, L. (2024). Can artificial chatbots improve mental health? A scoping review. *Computers, Informatics, Nursing*, *42*(10), 731–736. https://doi.org/10.1097/CIN.0000000000001155

Gomes, N., Pato, M., Lourenço, A. R., & Datia, N. (2023). A survey on wearable sensors for mental health monitoring. *Sensors (Basel, Switzerland)*, *23*(3), 1330. https://doi.org/10.3390/s23031330

Gutierrez, G., Stephenson, C., Eadie, J., Asadpour, K., & Alavi, N. (2024). Examining the role of AI technology in online mental healthcare: opportunities, challenges, and implications, a mixed-methods review. *Frontiers in Psychiatry*, *15*, Article 1356773. https://doi.org/10.3389/fpsyt.2024.1356773

Győrffy, Z., Radó, N., & Mesko, B. (2020). Digitally engaged physicians about the digital health transition. *PloS One*, *15*(9), e0238658. https://doi.org/10.1371/journal.pone.0238658

Hennemann, S., Farnsteiner, S., & Sander, L. (2018). Internet- and mobile-based aftercare and relapse prevention in mental disorders: a systematic review and recommendations for future research. *Internet Interventions*, *14*, 1–17. https://doi.org/10.1016/j.invent.2018.09.001

Jackson, H. M., Batterham, P. J., Ohan, J. L., Calear, A. L., & Farrer, L. M. (2024). Skill enactment and knowledge acquisition among community users of digital mental health interventions: qualitative study with thematic analysis. *BMC Psychiatry*, *24*(1), 545. https://doi.org/10.1186/s12888-024-05953-3

Jagayat, J. K., Kumar, A., Shao, Y., Pannu, A., Patel, C., Shirazi, A., Omrani, M., & Alavi, N. (2024). Incorporating a stepped care approach into Internet-based cognitive behavioral therapy for depression: Randomized controlled trial. *JMIR Mental Health*, *11*, e51704. https://doi.org/10.2196/51704

Kählke, F., Buntrock, C., Smit, F., & Ebert, D. D. (2022). Systematic review of economic evaluations for internet- and mobile-based interventions for mental health problems. *NPJ Digital Medicine*, *5*(1), 175. https://doi.org/10.1038/s41746-022-00702-w

Käll, A., Biliunaite, I., & Andersson, G. (2024). Internet-delivered cognitive behavior therapy for affective disorders, anxiety disorders and somatic conditions: an updated systematic umbrella review. *Digital Health*, *10*. https://doi.org/10.1177/20552076241287643

Kaihlanen, A. M., Virtanen, L., Buchert, U., Safarov, N., Valkonen, P., Hietapakka, L., Hörhammer, I., Kujala, S., Kouvonen, A., & Heponiemi, T. (2022). Towards digital health equity – a qualitative study of the challenges experienced by vulnerable groups in using digital health services in the COVID-19 era. *BMC Health Services Research*, *22*(1), 188. https://doi.org/10.1186/s12913-022-07584-4

Karekla, M., Kasinopoulos, O., Neto, D. D., Ebert, D. D., Daele, T. V., Nordgreen, T., Höfer, S., Oeverland, S., & Jensen, K. L. (2019). Best practices and recommendations for digital interventions to improve engagement and adherence in chronic illness sufferers. *European Psychologist*, *24*(1), 49–67. https://doi.org/10.1027/1016-9040/a000349

Karyotaki, E., Efthimiou, O., Miguel, C., Bermpohl, F. M. G., Furukawa, T. A., Cuijpers, P., Individual Patient Data Meta-Analyses for Depression (IPDMA-DE) Collaboration., Riper, H., Patel, V., Mira, A., Gemmil, A. W., Yeung, A. S., Lange, A., Williams, A., Mackinnon, A., Geraedts, A., van Straten, A., Meyer, B., Björkelund, C., … Forsell, Y. (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

Karyotaki, E., Miguel, C., Panagiotopoulou, O. M., Harrer, M., Seward, N., Sijbrandij, M., Araya, R., Patel, V. & Cuijpers, P. (2023). Digital interventions for common mental disorders in low-and middle-income countries: a systematic review and meta-analysis. *Cambridge Prisms: Global Mental Health*, *10*, e68, 1–13. https://doi.org/10.1017/gmh.2023.50

Karyotaki, E., Riper, H., Twisk, J., Hoogendoorn, A., Kleiboer, A., Mira, A., Mackinnon, A., Meyer, B., Botella, C., Littlewood, E., Andersson, G., Christensen, H., Klein, J. P., Schröder, J., Bretón-López, J., Schneider, J., Griffiths, K., Farrer, L., Huibers, M. J., … Cuijpers, P. (2017). Efficacy of self-guided internet-based cognitive behavioral therapy in the treatment of depressive symptoms: a meta-analysis of individual participant data. *JAMA Psychiatry*, *74*(4), 351–359. https://doi.org/10.1001/jamapsychiatry.2017.0044

Kasinopoulos, O., Vasiliou, V., & Karekla, M. (2023). Overcoming challenges in adherence and engagement in digital interventions: The development of the ALGEApp for chronic pain management. *Internet Interventions*, *32*. https://doi.org/10.1016/j.invent.2023.100611

Kapoor, S., Cantrell, E. M., Peng, K., Pham, T. H., Bail, C. A., Gundersen, O. E., Hofman, J. M., Hullman, J., Lones, M. A., Malik, M. M., Nanayakkara, P., Poldrack, R. A., Raji, I. D., Roberts, M., Salganik, M. J., Serra-Garcia, M., Stewart, B. M., Vandewiele, G., & Narayanan, A. (2024). REFORMS: Consensus-based recommendations for machine-learning-based science. *Science Advances*, *10*(18), eadk3452. https://doi.org/10.1126/sciadv.adk3452

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

Kerz, E., Zanwar, S., Qiao, Y., & Wiechmann, D. (2023). Toward explainable AI (XAI) for mental health detection based on language behavior. *Frontiers in Psychiatry*, *14*. https://doi.org/10.3389/fpsyt.2023.1219479

Kirvin-Quamme, A., Kissinger, J., Quinlan, L., Montgomery, R., Chernenok, M., Pirner, M. C., Pajarito, S., Rapoport, S., Wicks, P., Darcy, A., Greene, C. J., & Robinson, A. (2024). Common practices for sociodemographic data reporting in digital mental health intervention research: a scoping review. *BMJ Open*, *14* (2), e078029. https://doi.org/10.1136/bmjopen-2023-078029

Khoo, L. S., Lim, M. K., Chong, C. Y., & McNaney, R. (2024). Machine learning for multimodal mental health detection: a systematic review of passive sensing approaches. *Sensors (Basel, Switzerland)*, *24*(2), 348.

Kjell, O. N. E., Kjell, K., & Schwartz, H. A. (2024). Beyond rating scales: with targeted evaluation, large language models are poised for psychological assessment. *Psychiatry Research*, *333*, 115667. https://doi.org/10.1016/j.psychres.2023.115667

Koh, J., Tng, G. Y. Q., & Hartanto, A. (2022). Potential and pitfalls of mobile mental health apps in traditional treatment: An umbrella review. *Journal of Personalized Medicine*, *12*(9), 1376. https://doi.org/10.3390/jpm12091376

Kong, T., Scott, M. M., Li, Y., & Wichelman, C. (2020). Physician attitudes towards-and adoption of-mobile health. *Digital Health*, *6*, 2055207620907187. https://doi.org/10.1177/2055207620907187

Konstantinou, P., Trigiorgi, A., Georgiou, C., Gloster, A.T., Panayiotou, G., & Karekla, M. (2020). Comparing apples and oranges or different types of citrus fruits? Using wearable vs. stationary devices to analyze psychophysiological data. *Psychophysiology*, *57*. https://doi:10.1111/psyp.13551

Kooistra, L. C., Ruwaard, J., Wiersma, J. E., van Oppen, P., van der Vaart, R., van -Pijnen, J. E., & Riper, H. (2016). Development and initial evaluation of cognitive behavioral treatment for major depression in routine specialized mental health care. *Internet Interventions*, *4*, 61–71. https://doi.org/10.1016/j.invent.2016.01.003

Kozelka, E. E., Acquilano, S. C., Al-Abdulmunem, M., Guarino, S., Elwyn, G., Drake, R. E., & Carpenter-Song, E. (2023). Documenting the digital divide: identifying barriers to digital mental health access among people with serious mental illness in community settings. *SSM – Mental Health*, *4*, 100241. https://doi.org/10.1016/j.ssmmh.2023.100241

Kozelka, E. E., Jenkins, J. H., & Carpenter-Song, E. (2021). Advancing health equity in digital mental health: lessons from medical anthropology for global mental health. *JMIR Mental Health*, *8*(8), e28555. https://doi.org/10.2196/28555

Kuhn, E., Saleem, M., Klein, T., Köhler, C., Fuhr, D. C., Lahutina, S., Minarik, A., Musesengwa, R., Neubauer, K., Olisaeloka, L., Osei, F., Reinhold, A. S., Singh, I., Spanhel, K., Thomas, N., Hendl, T., Kellmeyer, P., & Böge, K. (2024). Interdisciplinary perspectives on digital technologies for global mental health. *PLOS Global Public Health*, *4*(2), e0002867. https://doi.org/10.1371/journal.pgph.0002867

Lattie, E., Adkins, P., Winquist, N., Stiles-Shields, C., Wafford, P., & Mst, M. (2018). Digital mental health interventions for depression, anxiety, and enhancement of psychological well-Being among college students: systematic review. *Journal of Medical Internet Research*, *21*. https://doi.org/10.2196/12869

Linardatos, P., Papastefanopoulos, V., & Kotsiantis, S. (2020). Explainable AI: a review of machine learning interpretability methods. *Entropy (Basel, Switzerland)*, *23*(1), 18. https://doi.org/10.3390/e23010018

Linardon, J., Cuijpers, P., Carlbring, P., Messer, M. and Fuller-Tyszkiewicz, M. (2019). The efficacy of app-supported smartphone interventions for mental health problems: a meta-analysis of randomized controlled trials. *World Psychiatry*, *18*, 325–336. https://doi.org/10.1002/wps.20673

Liu, M., & Schueller, S.M. (2023). Moving evidence-based mental health interventions into practice: implementation of digital mental health interventions. *Current Treatment Options in Psychiatry*, *10*, 333–345. https://doi.org/10.1007/s40501-023-00298-2

Mendes-Santos, C., Weiderpass, E., Santana, R., & Andersson, G. (2020). Portuguese psychologists' attitudes toward internet interventions: exploratory cross-sectional study. *JMIR Mental Health*, *7*(4), e16817. https://doi.org/10.2196/16817

Mitchell, L. M., Joshi, U., Patel, V., Lu, C., & Naslund, J. A. (2021). Economic evaluations of internet-based psychological interventions for anxiety disorders and depression: a systematic review. *Journal of Affective Disorders*, *284*, 157–182. https://doi.org/10.1016/j.jad.2021.01.092

Muñoz, R. F., Chavira, D. A., Himle, J. A., Koerner, K., Muroff, J., Reynolds, J., Rose, R. D., Ruzek, J. I., Teachman, B. A., & Schueller, S. M. (2018). Digital apothecaries: a vision for making health care interventions accessible worldwide. *mHealth*, *4*, 18. https://doi.org/10.21037/mhealth.2018.05.04

Nguyen, T. T., Pham, V. H.-Q., Le, D.-T., Vu, X.-S., Deligianni, F., & Nguyen, H. D. (2023). Multimodal machine learning for mental disorder detection: a scoping review. *Procedia Computer Science*, *225*, 1458–1467. https://doi.org/10.1016/j.procs.2023.10.134

Nicholas, J., Ringland, K. E., Graham, A. K., Knapp, A. A., Lattie, E. G., Kwasny, M. J., & Mohr, D. C. (2019). Stepping up: Predictors of "stepping" within an iCBT stepped-care intervention for depression. *International Journal of Environmental Research and Public Health*, *16*(23), 4689. https://doi.org/10.3390/ijerph16234689

Niemeijer, K., Mestdagh, M., & Kuppens, P. (2022). Tracking subjective sleep quality and mood with mobile sensing: multiverse study. *Journal of Medical Internet Research*, *24*(3), e25643. https://doi.org/10.2196/25643

Nogueira-Leite, D., Diniz, J. M., & Cruz-Correia, R. (2023). Mental health professionals' attitudes toward digital mental health apps and implications for adoption in Portugal: Mixed methods study. *JMIR Human Factors*, *10*, e45949. https://doi.org/10.2196/45949

Noh, D., & Kim, H. (2023). Effectiveness of online interventions for the universal and selective prevention of mental health problems among adolescents: a systematic review and meta-analysis. *Prevention Science: The Official Journal of the Society for Prevention Research*, *24*(2), 353–364. https://doi.org/10.1007/s11121-022-01443-8

Piers, R., Williams, J. M., & Sharpe, H. (2023). Can digital mental health interventions bridge the "digital divide" for socioeconomically and digitally marginalised youth? A systematic review. *Child and Adolescent Mental Health*, 28(1), 90–104. https://doi.org/10.1111/camh.12620

Preschl, B., Maercker, A., & Wagner, B. (2011). The working alliance in a randomized controlled trial comparing online with face-to-face cognitive-behavioral therapy for depression. *BMC Psychiatry*, *11*, 189. https://doi.org/10.1186/1471-244X-11-189

Rawnsley, C., & Stasiak, K. (2024). Unlocking the digital toolbox – A mixed methods survey of New Zealand mental health clinicians' knowledge, use and attitudes towards digital mental health interventions. *Journal of Technology in Behavioral Science*, *9*(4), 875–885. https://doi.org/10.1007/s41347-024-00403-z

Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

(General Data Protection Regulation) (Text with EEA relevance). (2016). *Official Journal of the European Union, L 119*, 1–88. http://data.europa.eu/eli/reg/2016/679/oj.

Regulation (EU) 2017/745 of the European Parliament and of the Council of 5 April 2017 on medical devices, amending Directive 2001/83/EC, Regulation (EC) No 178/2002 and Regulation (EC) No 1223/2009 and repealing Council Directives 90/385/EEC and 93/42/EEC (Text with EEA relevance). (2017). *Official Journal of the European Union, L 117*, 1-177.

Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence (Artificial Intelligence Act). (2024). *Official Journal of the European Union, L 2024/1689*. https://eur-lex.europa.eu/eli/reg/2024/1689/oj/eng

Rezaii, N., Walker, E., & Wolff, P. (2019). A machine learning approach to predicting psychosis using semantic density and latent content analysis. *NPJ Schizophrenia*, *5*(1), 9. https://doi.org/10.1038/s41537-019-0077-9

Ramos, G., Hernandez-Ramos, R., Taylor, M., & Schueller, S. M. (2024). State of the science: using digital mental health interventions to extend the impact of psychological services. *Behavior Therapy*, *55*(6), 1364–1379. https://doi.org/10.1016/j.beth.2024.04.004

Rohrbach, P. J., Dingemans, A. E., Evers, C., Van Furth, E. F., Spinhoven, P., Aardoom, J. J., Lähde, I., Clemens, F. C., & Van den Akker-Van Marle, M. E. (2023). Cost-effectiveness of internet interventions compared with treatment as usual for people with mental disorders: systematic review and meta-analysis of randomized controlled trials. *Journal of Medical Internet Research*, *25*, e38204. https://doi.org/10.2196/38204

Rojas-Barahona, L., Tseng, B.-H., Dai, Y., Mansfield, C., Ramadan, O., Ultes, S., Crawford, M., & Gašić, M. (2018). Deep learning for language understanding of mental health concepts derived from cognitive behavioral therapy. In *Proceedings of the Ninth International Workshop on Health Text Mining and Information Analysis* (pp. 44–54). Association for Computational Linguistics. https://doi.org/10.18653/v1/W18-5606

Rozental, A., Andersson, G., Boettcher, J., Ebert, D. D., Cuijpers, P., Knaevelsrud, C., Ljótsson, B., Kaldo, V., Titov, N., & Carlbring, P. (2014). Consensus statement on defining and measuring negative effects of Internet interventions. *Internet Interventions*, *1*(1), 12–19. https://doi.org/10.1016/j.invent.2014.02.001

Rozental, A., Magnusson, K., Boettcher, J., Andersson, G., & Carlbring, P. (2017). For better or worse: An individual patient data meta-analysis of deterioration among participants receiving Internet-based cognitive behavior therapy. *Journal of Consulting and Clinical Psychology*, *85* (2), 160–177. https://doi.org/10.1037/ccp0000158

Saleem, M., Kühne, L., Santis, K., Christianson, L., Brand, T., & Busse, H. (2021). Understanding engagement strategies in digital interventions for mental health promotion: scoping review. *JMIR Mental Health*, *8*. https://doi.org/10.2196/30000

San Miguel, L., Obyn, C., Vinck, I., de Meester, C., Jespers, V., Pouppez, C. (2022). *Evaluation of Digital Medical Technologies. Health Technology Assessment (HTA)*. Belgian Health Care Knowledge Centre (KCE). KCE Reports 362s.

Sander, L., Rausch, L., & Baumeister, H. (2016). Effectiveness of internet-based interventions for the prevention of mental disorders: a systematic review and meta-analysis. *JMIR Mental Health*, 3(3), e6061. https://doi.org/10.2196/mental.6061

Saqib, K., Khan, A. F., & Butt, Z. A. (2021). Machine learning methods for predicting postpartum depression: scoping review. *JMIR Mental Health*, *8*(11), e29838. https://doi.org/10.2196/29838

Schermuly-Haupt, M. L., Linden, M., & Rush, A. J. (2018). Unwanted events and side effects in cognitive behavior therapy. *Cognitive Therapy and Research*, *42*, 219–229. https://doi.org/10.1007/s10608-018-9904-y

Schueller, S. M., Hunter, J. F., Figueroa, C., & Aguilera, A. (2019). Use of digital mental health for marginalized and underserved populations. *Current Treatment Options in Psychiatry*, 6, 243–55. https://doi.org/10.1007/s40501-019-00181-z

Sin, J., Galeazzi, G., McGregor, E., Collom, J., Taylor, A., Barrett, B., Lawrence, V., & Henderson, C. (2020). Digital interventions for screening and treating common mental disorders or symptoms of common mental illness in adults: systematic and meta-analysis. *Journal of Medical Internet Research*, *22*(9). e20581. https://doi.org/10.2196/20581

Smith, K. A., Blease, C., Faurholt-Jepsen, M., Firth, J., Van Daele, T., Moreno, C., Carlbring, P., Ebner-Priemer, U. W., Koutsouleris, N., Riper, H., Mouchabac, S., Torous, J., & Cipriani, A. (2023). Digital mental health: challenges and next steps. *BMJ Mental Health*, *26*, e300670. https://doi.org/10.1136/bmjment-2023-300670

Smoktunowicz, E., Barak, A., Andersson, G., Banos, R. M., Berger, T., Botella, C., Dear, B. F., Donker, T., Ebert, D. D., Hadjistavropoulos, H., Hodgins, D. C., Kaldo, V., Mohr, D. C., Nordgreen, T., Powers, M. B., Riper, H., Ritterband, L. M., Rozental, A., Schueller, S. M., Titov, N., . . . Carlbring, P. (2020). Consensus statement on the problem of terminology in psychological interventions using the internet or digital components. *Internet Interventions*, *21*, 100331. https://doi.org/10.1016/j.invent.2020.100331

Sorkin, D. H., Janio, E. A., Eikey, E. V., Schneider, M., Davis, K., Schueller, S. M., Stadnick, N. A., Zheng, K., Neary, M., Safani, D., & Mukamel, D. B. (2021). Rise in use of digital mental health tools and technologies in the united states during the COVID-19 pandemic: survey study. *Journal of Medical Internet Research*, *23*(4), e26994. https://doi.org/10.2196/26994

Spanhel, K., Schweizer, J. S., Wirsching, D., Lehr, D., Baumeister, H., Bengel, J., & Sander, L. (2019). Cultural adaptation of internet interventions for refugees: results from a user experience study in Germany. *Internet Interventions*, *18*, 100252. https://doi.org/10.1016/j.invent.2019.100252

Stoeckl, S. E., Torres-Hernandez, E., Camacho, E., & Torous, J. (2023). Assessing the dynamics of the mental health apple and android app marketplaces. *Journal of Technology in Behavioral Science*, 1–8. Advance online publication. https://doi.org/10.1007/s41347-023-00300-x

The Wellcome Trust.. (2024). How lived experience expertise shapes research and development in digital mental health [version 1; not peer reviewed]. *Wellcome Open Res*, *9*, 373. https://doi.org/10.21955/wellcomeopenres.1115394.1

Timmons, A. C., Duong, J. B., Simo Fiallo, N., Lee, T., Vo, H. P. Q., Ahle, M. W., Comer, J. S., Brewer, L. C., Frazier, S. L., & Chaspari, T. (2023). A call to action on assessing and mitigating bias in artificial intelligence: Applications for mental health. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*, *18*(5), 1062–1096. https://doi.org/10.1177/17456916221134490

Torous, J., Lipschitz, J., Ng, M., & Firth, J. (2020). Dropout rates in clinical trials of smartphone apps for depressive symptoms: A systematic review and meta-analysis. *Journal of Affective Disorders*, *263*, 413–419. https://doi.org/10.1016/j.jad.2019.11.167

Torous, J., Nicholas, J., Larsen, M. E., Firth, J., & Christensen, H. (2018). Clinical review of user engagement with mental health smartphone apps: Evidence, theory and improvements. *Evidence-based mental health*, *21*(3), 116–119. https://doi.org/10.1136/eb-2018-102891

Wang, X., Markert, C., & Sasangohar, F. (2023). Investigating popular mental health mobile application downloads and

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

activity during the COVID-19 pandemic. *Human Factors*, *65*(1), 50–61. https://doi.org/10.1177/00187208219981

Wenzel, J., Dreschke, N., Hanssen, E., Rosen, M., Ilankovic, A., Kambeitz, J., Fett, A. K., & Kambeitz-Ilankovic, L. (2024). Ecological momentary assessment (EMA) combined with unsupervised machine learning shows sensitivity to identify individuals in potential need for psychiatric assessment. *European Archives of Psychiatry and Clinical Neuroscience*, *274*(7), 1639–1649. https://doi.org/10.1007/s00406-023-01668-w

Werntz, A., Amado, S., Jasman, M., Ervin, A., & Rhodes, J. E. (2023). Providing human support for the use of digital mental health interventions: Systematic meta-review. *Journal of Medical Internet Research*, *25*. https://doi.org/10.2196/42864

Wilson, S., Tolley, C., Mc Ardle, R., Lawson, L., Beswick, E., Hassan, N., Slight, R., & Slight, S. (2024). Recommendations to advance digital health equity: a systematic review of qualitative studies. *NPJ Digital Medicine*, *7*(1), 173. https://doi.org/10.1038/s41746-024-01177-7

Woolley, M. G., Klimczak, K. S., Davis, C. H., & Levin, M. E. (2024). Predictors of adherence to a publicly available self-guided digital mental health intervention. *Cognitive Behavior Therapy*, *53*(6), 577–591. https://doi.org/10.1080/16506073.2024.2341807

World Health Organization. (2022). *World mental health report: Transforming mental health for all*. World Health Organization.

Zhang, M., Fan, C., Ma, L., Wang, H., Zu, Z., Yang, L., Chen, F., Wei, W., & Li, X. (2024). Assessing the effectiveness of internet-based interventions for mental health outcomes: an umbrella review. *General Psychiatry*, *37*, e101355. https://doi.org/10.1136/gpsych-2023-101355

History
Received April 19, 2025
Revision received March 17, 2026
Accepted April 14, 2026
Published online August 19, 2026

Conflict of Interest
None of the authors have any conflicts of interest to declare regarding this article.

Publication Ethics
During the preparation of this work the authors used ChatGPT in order to assist with translation and language refinement. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Authorship
João Salgado, conceptualization, project administration, writing – original draft, writing – review & editing; Marta Gomes, writing – original draft, writing – review & editing; Márta Csabai, writing – original draft; Tom Van Daele, writing – original draft, writing – review & editing; Frank Doyle, writing – original draft; Jonas Eimontas, writing – original draft, writing – review & editing, Rikke Nørgaard Elster, writing – original draft; David Gosar, writing – original draft, writing – review & editing; Lise Haddouk, writing – original draft; Maria Karekla, writing – review & editing; David Neto, writing – original draft, writing – review & editing; Sanda Stankovic, writing – original draft, writing – review & editing
All authors approved the final version of the article.

Funding
This research was partially supported by the Portuguese Foundation for Science and Technology (FCT) under the Pluriannual Funding Programme for Research Units (UID/00050/2025; https://doi.org/10.54499/UID/00050/2025).

ORCID
João Salgado
https://orcid.org/0000-0003-0822-9267
Marta Gomes
https://orcid.org/0009-0007-5234-8200
Márta Csabai
https://orcid.org/0000-0002-3194-6208
Tom Van Daele
https://orcid.org/0000-0001-9237-9297
Frank Doyle
https://orcid.org/0000-0002-3785-7433
Jonas Eimontas
https://orcid.org/0000-0003-2638-0235
Rikke Nørgaard Elster
https://orcid.org/0009-0005-5120-2432
David Gosar
https://orcid.org/0000-0002-5289-3459
Lise Haddouk
https://orcid.org/0000-0002-2139-3849
Maria Karekla
https://orcid.org/0000-0001-7021-7908
David Neto
https://orcid.org/0000-0002-3129-262X
Sanda Stankovic
https://orcid.org/0000-0002-3550-0430

João Salgado
Department of Social and Behavioral Sciences
University of Maia
Av. Carlos de Oliveira Campos
4475-690 Maia, Porto
Portugal
jsalgado@umaia.pt

João Salgado is an Assistant Professor, Director of the PhD in Clinical Psychology, and Vice-Rector at University of Maia. He is also a Fellow member of the Center of Psychology at the University of Porto. His main interests in empirical research are focused on psychotherapy research, especially in the domain of depression and the process of emotional change. His more recent work has been incorporating e-health tools for the assessment and treatment of depression and other mental health problems.

Marta Gomes is a psychologist and PhD student in clinical psychology at University of Maia and the Center for Psychology at University of Porto. Her research interests include psychological interventions, psycho-oncology, emotional processing, and digital mental health.

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)

https://econtent.hogrefe.com/doi/pdf/10.1027/1016-9040/a000588 - Wednesday, August 26, 2026 3:15:30 AM - IP Address:194.210.215.34

Marta Csabai, clinical and health psychologist, is a full professor at Károli Gáspár University of the Reformed Church in Hungary. Her research focuses on the social-psychological aspects of physical illness, the well-being of health professionals, and communication in healthcare.

Tom Van Daele is the research coordinator for Psychology and Technology at Thomas More University of Applied Sciences, an honorary professor at Queen's University Belfast, and a research fellow at KU Leuven.

Frank Doyle is based in RCSI University of Medicine and Health Sciences. His wide-ranging research interests include depression, psychometrics, health behaviours and complex interventions. He is a Fellow of the Psychological Society of Ireland and the European Health Psychology Society.

Jonas Eimontas (PhD) is an Associate Professor of Clinical Psychology and Head of the Department of Clinical Psychology at the Institute of Psychology, Faculty of Philosophy, Vilnius University, Lithuania. His research focuses on the development and evaluation of internet-delivered treatments for a range of mental health problems.

Rikke Nørgaard Elster is a licensed clinical psychologist and former CPO and Chief Psychologist at a Danish mental health tech company. During her 6 years with the company, she focused on combining clinical expertise with digital innovation to make psychological support more accessible, scalable, and user-centered. Today, she works as a clinical psychologist specializing in digital therapy and technology-enabled mental health solutions.

David Gosar (PhD) is a clinical psychologist working at the University Children's Hospital in Ljubljana, Slovenia. In addition to pursuing his interest in neuropsychology, he strives to incorporate advancements in the fields of e-psychology, data science and information technology into main stream psychology in a responsible and scientifically rigorous fashion.

Lise Haddouk is a clinical psychologist and HDR associate professor, and a researcher at the Centre Borelli (UMR9010). Her work focuses on cyberpsychology, telepsychology, and the ergonomics of emerging technologies, and she leads international programmes in e-health and interdisciplinary training.

Maria Karekla (PhD) is a clinical psychologist, ACT trainer, and Professor at the University of Cyprus, leading the ACTHealthy lab. Her research focuses on psychological flexibility, health behaviors, and digital interventions. She has received international recognition, served on national committees, and held leadership roles in major psychological organizations, with extensive publications and awards.

David Dias Neto (PhD) is an Assistant Professor at ISPA – Instituto Universitário and a researcher in APPsyCI. He concluded his doctoral degree in 2011, jointly awarded by the University of Lisbon and the University of Sheffield. He was the former president of the clinical and health psychology division of the Portuguese Order of Psychologists.

Sanda Stanković is a research fellow at the Department of Psychology and LIRA Lab, Faculty of Philosophy, University of Belgrade (Serbia). Her research interests include mental health, personality and individual differences, and gender.

© 2026 The Author(s). Distributed as a Hogrefe OpenMind article under the license CC BY 4.0 (https://creativecommons.org/licenses/by/4.0)