



Editorial

Editorial Introduction to Technological Approaches for the Treatment of Mental Health in Youth

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According to the World Health Organization (WHO), 10–20% of adolescents (10–19 years old) worldwide suffer from mental health conditions, with 50% starting at the age of 14 (World Health Organization 2020). Traditionally, mental health problems among youth have been addressed with psychotherapy conducted via face-to-face methods. However, many youth are actively seeking resources online for mental health support (Stephens et al. 2020; Rideout et al. 2018). Therefore, digital interventions can provide alternative methods to support youth patients while addressing and improving the limitations of face-to-face delivery formats. This has become more evident during the COVID-19 pandemic, where clinicians have been forced to use creative strategies, such as telehealth to reach their patients remotely.

The field of digital interventions for mental health has been growing in the last four decades (Zale et al. 2021), representing a new paradigm in mental health. However, most digital interventions have focused on adults, and the growth of youth-specific digital interventions and associated research has been less robust, and more research is needed. There have been studies on utilizing all sorts of technologies, including video games for the treatment of depression (Sparx) and anxiety (Mindlight), mobile phone apps as adjuncts to face-to-face interventions for anxiety (SmartCat), online interventions for depression prevention (CATCH-IT), and a robotic intervention to teach social skills for children with autism spectrum disorder (iRobiQ). The development and research of these interventions are still in the early stages—focusing mostly on development and feasibility rather than controlled efficacy studies. Additionally, such studies present several limitations, such as small sample sizes, high attrition rates, and lack of generalizability to community settings. While there is significant potential for these interventions, there is still much improvement needed.

The purpose of this Special Issue is to promote and disseminate research that focuses on how technology can be used to support the treatment of mental health in youth. The articles included in the current issue focus on behavioral intervention technologies (BITs), such as mobile phone apps, chatbots, artificial intelligence, automated Internet-based interventions, and videoconferencing. All these studies could be broadly categorized into three groups: Intervention development, usability, and intervention outcomes.

One study (Smith et al. 2021) explored the impact of digital overload and its implications on mobile mental health app use and development among college students. Qualitative and quantitative data suggest that participants with high phone usage (i.e., receiving many notifications) did not experience “digital overload”, but they ignored

the notifications. Thus, when designing mental health apps, notifications alone may not improve engagement, and other factors should be taken into account, such as motivation.

Several studies focused on aspects of usability and feasibility. [Rogers et al. \(2021\)](#) conducted a secondary analysis of a randomized controlled trial to investigate the moderating role of human support on engagement of an Internet-based depression prevention program called CATCH-IT among youth. Overall results suggest that motivational interviews and the number of human contacts increased engagement, however, there was no significant improvement in depression scores based on engagement. Thus, human support in an intervention for adolescents that are tech-savvy may not be as needed. [White et al. \(2021\)](#) described how a model of autism treatment with children was adapted for delivery via telehealth during the COVID-19 pandemic. They outline the practical details of the transition and how therapists can capitalize on key aspects of the technology to enhance treatment. The authors note that in-person protocols for treatment are typically extensive, 10–25 h per week, thus imperative to further investigate the optimal number of hours for video conferencing and how online and in-person elements in treatment can be combined. Another article by [Entenberg et al. \(2021\)](#) assessed the feasibility of delivering parenting tips via an artificial intelligence based chatbot accessed through social media. The study found that most parents completed the intervention, engaged with the bot, and would recommend it to others, which is promising in terms of scalable low-cost interventions to support parenting skills. [Lu et al. \(2021\)](#) explored how adolescents perceive a mobile app for social anxiety and whether app usage could positively impact participant engagement in group treatment delivered via videoconference. The app was intended to facilitate preparation for therapy sessions and for skill-practice outside therapy time. Through a consensual qualitative research approach, the authors conclude that adolescents perceived that the app increased their comfort with others during therapy and improved their own attitudes towards mental health apps. [Williams et al. \(2021\)](#) examined the feasibility and acceptability of a chatbot designed to reinforce coping strategies for stress and anxiety in a non-clinical population of young adults. The chatbot used a persona who messaged the user via Facebook and delivered stress management techniques. Participants generally found the chatbot easy to use, with convenience and relatable content being valued features. Chatbot use was associated with a reduction in stress and increase in subjective well-being.

Four studies focused on intervention outcomes. [Bausback and Bunge \(2021\)](#) conducted a meta-analysis on Behavioral Intervention Technologies (BITs) on Behavioral Parent Training (BPT) for treating child and adolescent externalizing behavior. Results found that overall, BITs for parent training is an effective treatment in reducing behavioral problems. Furthermore, there were no significant differences in the reduction of behavioral problems by level of human support, clinical vs. non-clinical population, or sociodemographic variables. These findings provide preliminary evidence that BITs BPT is effective in addressing child and adolescent externalizing behavior in a variety of populations. [Rasing et al. \(2021\)](#) investigated long-term outcomes for blended CBT compared to face-to-face CBT, and treatment as usual with adolescents suffering clinical depression. They found that clinical diagnosis, depressive symptoms, suicide risk, internalizing symptoms, and externalizing symptoms decreased significantly over time and that there were no differences in outcomes for blended CBT compared to face-to-face CBT, or treatment as usual. The study shows that blended treatment, the combination of in-person and online treatment components, might be a valuable alternative to more intensive in-person treatments. [Gladstone et al. \(2021\)](#) developed and evaluated a depression prevention intervention for college students. Their paper provides valuable insight into which contextual and content components of treatment that matter to students and strategies to involve students early in the development of digital mental health interventions. In the evaluation of the intervention with college students, the intervention was associated with positive outcomes, such as acceptability, feasibility, and a decrease of internalizing symptoms. [Gupta et al. \(2021\)](#) analyzed the impact of an Internet depression prevention program for adolescents (CATCH-IT) compared to a Health Education (HE) control group in a primary care health

setting. Participants in CATCH-IT showed significant improvements in motivation, coping, and family relations as compared to HE and would recommend the intervention. The authors conclude that the implementation of CATCH-IT in primary care may benefit some at-risk adolescents.

The papers in this special issue describe a wide variety of interventions and study designs on current applications of technologies with youth and caregivers. The heterogeneity of the papers may be a reflection of how the pandemic accelerated the research on BITs for children and adolescents. Some studies show a long trajectory of research, whereas others document a rapid shift towards incorporating technology to deliver mental health resources in novel ways. Overall, the studies included in this Special Issue include implications for the use of technology with youth and can serve as a roadmap for those interested in the field of development, feasibility, and efficacy of BITs for children, adolescents, and young adults.

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