The original publication is available on https://doi.org/10.1016/j.copsyc.2021.02.007

Dropping the E: the potential for integrating e-mental health in psychotherapy

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Abstract

E-mental health, or the use of technology in mental healthcare, has been the focus of research for over two decades. Over that period, the evidence-base for the potential of technology to improve psychotherapeutic practice has grown steadily. This sharply contrasts with the actual use of e-mental health by psychotherapists, which has remained limited. In this article, we aim to illustrate how and when different technological tools and applications can play a role in psychotherapy. At the same time, we also highlight current limitations and discuss challenges for future research. A specific, yet hypothetical case is used to guide this narrative review and make proposed applications tangible and concrete.

Key words: e-mental health, mental healthcare, online self-help, ecological momentary assessment, wearables, virtual reality, augmented reality, digital phenotyping

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1. Introduction

The use of technology within mental healthcare, often referred to as e-mental health or digital mental health, has already been around for over two decades [1, 2]. It has received interest from researchers around the world, seeking the means to support mental healthcare services to overcome some of the challenges they have been facing, such as their limited capacity and suboptimal reach [3, 4]. The wide range of applications and the evidence-base that has accumulated, stands in sharp contrast to the actual use in clinical practice, where uptake has often occurred reluctantly and limitedly [5, 6]. The COVID-19 pandemic, however, resulted in a sudden global shift, particularly in the area of telepsychotherapy where it has proven to be an important means to provide continuity of care. This led some to hint at a potential tipping point of technology use becoming more mainstream [7].

At the moment, it is unclear whether technology will be fully embraced or whether that is an idle hope. This article aims to provide a narrative, non-exhaustive overview of the potential future use of technology as a part of psychotherapy, illustrated by a specific, yet hypothetical, case. *During a visit to the grocery store, Alex witnesses a brutal robbery. As two assailants run off, they leave behind a severely injured cashier and Alex, an unharmed, yet overwhelmed spectator. After sharing their experience with the police, Alex heads back home. In the following weeks, they nevertheless seem to have difficulties leaving the events behind them and experience both physical and psychological discomfort. They increasingly stay at home and shut themselves off from the outside world.* The journey of Alex' way to recovery, using a careful combination of conventional care enhanced with technology, will provide a framework and illustrate the potential, as well as the current limitations of the field of e-mental health.

2. Finding information and choosing a (first) treatment

In a search to better understand their current situation, Alex turns to the internet. Browsing the web, they find several websites explaining the nature of traumatic events and how these events can impact functioning. They also enroll for a self-help intervention but find insufficient resolve. The quality of online mental health information, including smartphone applications for mental health, currently varies greatly. This makes the internet far from a trusted source for such information and help, and therefore limits its potential [8, 9]. Even digital natives, who are often assigned superior digital skills, experience substantial barriers to online help-seeking, as they, for example, report difficulties in finding and assessing the trustworthiness of online resources [10]. When reliable sources of information are retrieved, the literacy required to fully grasp available online mental health information seems to be beyond the reach of the majority of the general population [11]. Online self-help interventions are fairly widespread and can be accessed through websites or smartphone apps. They often extend beyond mere text and also include videos and online exercises. Despite their proven efficacy for a wide range of mental health conditions, the overall evidence for their effectiveness in real-life settings remains limited [12]. Especially high drop-out appears to be a continuing issue [13]. Although this issue can be reduced by adding minimal contact with a mental healthcare professional, through so-called guided online self-help, prolonged participation in such interventions remains challenging [14].

One of the applications which Alex experiences as helpful, is a chatbot. Although they are well aware of the artificial nature of the conversation, Alex prefers such a conversational and tailored approach over reading plain text. Most chatbots are still rule-based and are implemented as a part of stand-alone software. They control and lead the conversations, which are mostly in written language. Users have limited possibilities for interaction: they can often choose from predefined options to engage with the chatbot (e.g., yes, no, maybe) and when open-ended answers are allowed, these are incorporated as a part of the rule-based conversation (‘Tell me about a situation you dealt with in the past.’ … ‘Keeping

this situation in mind, how did it make you feel'?). These applications focus primarily on therapy or training, in domains such as depression or autism [15]. Evidence on the outcomes of chatbots is limited, but generally, findings concerning diagnostic quality, therapeutic efficacy and user acceptability are promising [16].

3. Taking on psychotherapy

Although they have gained some insights into the nature and origin of their current state, Alex' general discomfort remains. After reaching out to a psychotherapist, they are asked to monitor their mood for a week, for several times a day. Becoming aware of the change in their mood patterns over the course of the day and in response to random events, proves to be insightful for Alex and also helps their psychotherapist to guide them towards recovery. Ecological momentary assessment (EMA) is an alternative approach to retrospective self-report. As it allows for the real-time gathering of information, often through a smartphone application, it can, for example, help to obtain a more clear picture of mood dysregulation, especially when frequently repeated over time and also taking into account context-specific information, like the activity one is engaged in at the time of reporting [17 18]. Currently, EMA is mostly used as a part of research projects, where it is often referred to as experience sampling monitoring [19]. The limited transfer may be in part due to the fact that few research applications actually manage to transfer to, or be made available for, clinical practice [20]. And even if they do so, making applications sufficiently engaging to stimulate long-term use will be another challenging hurdle to overcome [21].

Later on, Alex also makes use of a wearable device, which registers their psychophysiological responses. Somewhat surprisingly to them, the data reveal moments of increased psychophysiological activity that they were not fully aware of and can link to stressful events. These insights further guide treatment. The potential of psychophysiology has been best documented in the context of biofeedback. Real-time physiological processes like heart rate or skin conductance are shared with patients as a part of this treatment (component), with the aim of helping them to gain voluntary

control over these processes [22]. Large and expensive devices, which tended to limit mobility and led to most applications solely being explored in lab settings, have over time evolved to more compact wearables. Although the quality of the data gathered by the ever-increasing diversity of wearable devices is not yet fully meeting the gold standards of state-of-the-art lab equipment [23, 24, 25], collecting data in more ecologically valid settings is promising for psychological assessment and intervention. The evidence-base for the added value of wearables in clinical practice is, however, currently still very limited. An increasing range of applications are nevertheless emerging, with the potential to extend and ameliorate treatment, for example, in sleep monitoring or for the detection of stressors in everyday life [26, 27].

The therapist also suggests to make use of virtual reality (VR), as a means to facilitate an imaginal exposure session. After this successful session, an in-person visit to the site of the initial trauma also takes place, which proves to be very helpful. The fairly recent introduction of VR as a consumer technology contrasts with the long-standing tradition of this technology in specialized research settings, where patients have been exposed to virtual environments for over two decades, either through screens or using immersive head-mounted devices [28]. Although most studies have primarily focused on PTSD and anxiety disorders, particularly specific phobias, research has also been branching out into other mental health disorders [29]. VR treatments tend to share a number of common advantages for both treatment and assessment, like increased control and manipulation of environments, the potential for tailoring, and real-time automated data capture. There are nevertheless also a number of limitations, which for example relate to the lack of widely available, evidence-based software programs to use as a part of routine care. Keeping up with technological developments can also prove to be challenging, as this not only requires to remain informed of recent advances, for example concerning the potential in the emerging field of augmented reality [30], but often also implies (the purchase of) novel hardware equipment [31]. Although the exact working mechanisms in the context of anxiety disorders still seem up for debate [32], prolonged exposure appears to be the most commonly applied technique. A patient is gradually introduced into VR

trauma-related environments and explores accompanying memories and fears in a safe and controlled manner. A therapist can for example opt to start from a very generic setting (e.g., a default supermarket) and allow a patient to freely explore this environment. Subsequently, customizations can be added to tailor this environment to a particular trauma (e.g., noises, relevant colours or visuals, avatars of robbers) and a therapist can also be more directive in their guidance. The overall aim is to learn a patient how to emotionally (re)process information concerning the traumatic event more accurately, which in turn helps to remove negative feelings and fear responses concerning the trauma and related cues [33].

4. Maintaining balance

Alex gradually manages to go back to their daily routines and decides to install a tracking app on their smartphone for some time. It monitors their activities and notifies them if any changes occur in their day-to-day patterns. At one point, the app reports a strong drop in physical activity. Initially, they are automatically presented with practical and tailored advice, such as resuming their daily morning run, which Alex finds helpful. In the end though, they decide to get back in touch with their therapist for two additional follow-up sessions. The amount of data gathered as a part of our regular day-to-day activities is substantial and will only increase in the near future, as the amount of digital, connected devices we use and the information they are able to gather are only increasing over time. Digital phenotyping (DP), or the "moment-by-moment quantification of the individual-level human phenotype in situ using data from personal digital devices" [34] makes use of this potential. By combining data from smartphones, wearables and other devices, it obtains a digital index of an individual's behavior and functioning [35]. Psychotherapists could benefit from (even) better insights in the evolution of individual patients. DP could show them digital patterns that indicate a patient's stability, while also informing them of deviations from those patterns, which might warrant caution [36]. Perhaps even more importantly, DP could be used as a means to better distinguish individual patient characteristics and tailor treatments towards their individual needs, moving towards precision

mental health [37]. Compared to all the previous steps described in our hypothetical patient's trajectory, this last one is still largely theoretical, although rapid advances are nevertheless expected to be made in this domain.

5. Conclusion and recommendation

The trajectory outlined above illustrates how e-mental health, through a variety of technologies, could contribute to the extension and enhancement of psychotherapeutic practice. Further progress should, however, still be achieved in the field of translational and implementation research [38, 39]. E-mental health will only be able to reach its full potential, when it is sufficiently tailored to the particular context of mental healthcare, taking into account attitudes and preferences of psychotherapists, their clients, the organizations they are a part of, and the broader mental healthcare context that surrounds them [40]. What that potential exactly entails, also varies depending on the type of technology. On the one hand mobile apps currently seem most promising to improve (cost-)effectiveness of current services, even despite the challenges concerning continued usage. These do not only have a large reach, but can also be integrated with relative ease as a part of current practice (in high-income countries) or address unmet needs (in middle- to low-income countries) [41, 42]. On the other hand, technologies like virtual reality or digital phenotyping do not simply enhance current practices, but actually introduce new opportunities for the field of mental healthcare altogether. Such advanced technologies will require more time to reach their full potential.: Thresholds for actual usage are significantly higher, both for clinicians as for patients, and implementation will also require paying increased attention to ethical and deontological concerns that might arise [43].

Although the implementation of these aforementioned technologies might seem challenging, this goal is far from unattainable, but will require substantial investments from all relevant actors [44] . Healthcare professionals will, for example, have to seek sufficient continuous education and institutions for higher education should pay increasing attention to (the potential of) technology in their curricula [45]. Health services and regulatory agencies should on the one hand facilitate the use

of technology, for example through reimbursement, and on the other hand set quality criteria for professionals and determine competencies for those who want to make use of technology as a part of their treatments. Finally, also developers have a role to play, as applications should be developed multidisciplinary and robust evaluation evidence should be established in collaboration with researchers. These collaborative efforts will help us to move away from the current position of e-mental health as a distinct part of clinical practice. In time collective efforts and further technological evolutions will hopefully allow us to drop the e in e-mental health, and fully integrate technological approaches into mental healthcare.

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Author contributions

TVD wrote the original draft, after which PB, SB, EVA and NAJDW participated in the further reviewing and editing of the article.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.