

## Technology and Mental Health.

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The purpose of this special issue is to update the reader on the latest clinical advances in mobile technology and mental health. This issue covers everything from the use of smart phones to detect mood and anxiety to proof of concept tests of video games as interventions for mood disorders. This issue presents nine papers on this topic. Three papers focus on the use of digital monitoring for clinical decision making. *The Experience Sampling Method as an mHealth Tool to Support Self-monitoring, Self-Insight and Personalised Health Care in Clinical Practice* paper by van Os and colleagues shows how regular, brief assessments through the mobile phone can show variations in psychopathology in daily life and predict the development of psychopathology on an individual basis. This methodology can be blended with routine care and has the potential to improve outcomes and reduce costs. *Digital Technology and Clinical Decision-Making in Depression Treatment: Current Findings and Future Opportunities* by Hallgren and colleagues reviews the literature on the use of smart phones and wearable activity monitors as measures of depression. As was found in this paper there is considerable promise for these tools to monitor patients between sessions to assess their daily functioning in real time. Finally, the paper *Mobile Assessment of Heightened Skin Conductance in Posttraumatic Stress Disorder* by Roffman et al. demonstrates that the use of a low-cost mobile device for assessing psychophysiological hyperarousal reactivity in those with PTSD is feasible. The possibility to use such data in clinical practice has become possible and feasible and has great promise for improving the effects of current treatments.

Six of the articles in this issue focus on the use of technology for treatment of depression and anxiety disorders. In *Improving late life depression and cognitive control through the use of therapeutic video game technology: a proof of concept randomized trial*, the authors find that not only is this video game as effective as standard psychotherapy, but adherence to the game was substantial. *Anxiety: There's an app for that. A systematic review of anxiety apps* by Sucala and colleagues is a systematic review of apps for mobile phones aimed at reducing and treating anxiety. It shows that there are plenty of such apps available, but only a fraction of these were supported by randomized trials showing they are effective. *There's an app for that? The current state of mobile applications (apps) for DSM-5 Obsessive-Compulsive Disorder, Posttraumatic Stress Disorder, anxiety and mood disorders* by van Ameringen and colleagues gives an overview of the different types of apps that are available for OCD, PTSD mood and anxiety disorders. They differentiate between assessment apps, tracking apps, treatment apps and multipurpose apps. The conclusion once again is that the evidence supporting the effectiveness of these apps is limited. *Ecological Momentary Interventions for Depression and Anxiety* by Schueller and colleagues describes a fascinating process whereby behavioral interventions for these disorders may be effectively used as needed, during the day. This approach offers a level of "user-centeredness" not typically seen in most mobile or internet based therapies. *The Feasibility, Acceptability, and Effectiveness of PRIME-D: A Novel Mobile*

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1002/da.22636](https://doi.org/10.1002/da.22636).

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*Intervention Treatment for Depression* by Schlosser and colleagues presents data from a novel mobile application to help people with depression engage in goal directed behavior. A combination of goal setting tools, as needed on-line coaching, and a secure clinical community allows consumers a means of tailoring their treatment experience. Finally, *Internet-based guided self-help for post-traumatic stress disorder (PTSD): randomised controlled trial* by Catrin and colleagues presents the results of a randomized controlled trial of an internet-based intervention for post-traumatic stress disorder. It shows that this intervention is highly effective compared to a waiting list control group.

These papers shed light on the future of assessment and mental health treatment for depression and anxiety, one where patients may be able to access effective assessment and treatment for their depression or anxiety through an app store, or these treatments may be prescribed through their electronic health portals. But where does this leave clinicians? Will technology put an end to the traditional mental health industry, like natural gas did for coal or video streaming did for video-rental stores? We argue that no, our field is not endangered by technology, but instead will be enhanced by technology. Several studies have found that most consumers need support from experts, even when using technology as a means for treating depression and anxiety. Effect sizes found for internet interventions without any human support are considerably smaller than those when some human support is given (Karyotaki, Riper, Twisk, Hoogendoorn, Kleiboer, Mira, et al. 2017; Richards & Richardson, 2012). As one recent study found, technology that employed active coaching from professionals resulted in greater adherence to treatment and better overall outcomes (cite). Indeed, as was demonstrated in the Schlosser et al paper, professional coaches embedded in PRIME-D could serve consumers who were not able to come in for typical treatment, extending the reach of these therapists to communities where psychosocial intervention is less available. In Sweden, Australia and the Netherlands, where internet interventions have been increasingly integrated in routine care, many people still require face-to-face care. Blended treatments in which technology supported interventions are integrated with face-to-face help, are becoming the standard rapidly (Kleiboer, Smit, Bosmans, Ruwaard, Andersson, Topooco, et al., 2016).

In this context, internet-based psychosocial intervention made treatment more efficient, allowing those consumers who could manage their mood on their own to do so, while reserving valuable and limited mental health resources for consumers in greater need. As is described in the Hallgren and van Os papers, clinicians may very well benefit from information on their clients that can be gathered in real time, as it occurs. Rather than having to ask their clients about their week at each session, clinicians can say to their patients “let’s look at your week together” and use this real-time data collection for improved decision making. In these ways, technology has the potential to increase access to care, manage clinical capacities, and potentially improve quality of care.

While technology offers many opportunities for the mental health field, it cannot wholly replace essential features of mental health care, such as shared clinical decision making or the therapeutic relationship that helps motivate consumers to change when their depression or anxiety interferes with their motivation. Apps are not at a place yet where they can identify the nuances in consumer response to treatment and make personalized adjustments based on those nuances. Nor can an app

help consumers understand and draw connections between their behavior, mood and experiences. Although Amazon can recommend books you may enjoy, and Netflix likewise recommend movies based on your viewing profile, technology is not so sophisticated that it can accurately recommend the best app or treatment approach to a consumer with depression or anxiety or simulate a personal experience of therapeutic change. In this way, clinician-driven care is and will remain important.

But although technology can never replace human interaction, there is no doubt that it will change mental health care considerably. It will lead to more efficient care, will be able to help more patients for the same budget, and will create more consumer-friendly and less stigmatising help, empowering patients with tools that they can use themselves to reduce mental health problems. Maybe it will also lead to more effective interventions, because many of the possibilities provided by serious games, mobile sensing and ecological momentary assessment have not been available before. And it is very well possible that using ecological data improves the precision of treatments. Although all this has not yet been proven, technology will change mental health care, and this issue of Depression and Anxiety gives a nice overview of where technology may lead to in the next few years.

#### References

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