Left to Our Own Devices: Smartphone Use, Mental Health, and Academic Psychiatry

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Smartphones are often necessary for daily life, and their continued heavy use is an intrinsic goal of business. Yet there is growing scholarly and public awareness of negative associations between smartphone use and mental health. Unfortunately, these associations remain poorly understood. In particular, problematic smartphone use—deregulated use that interferes with daily life—is undertaught in academic medicine and underrecognized by clinicians providing psychiatric care. Academic psychiatry must take steps to advance research and promote awareness of the impact of smartphone use on mental health, incorporate smartphone use in clinical training and clinical care, promote healthy smartphone use, and improve understanding of ethical issues related to problematic use.

Smartphone Use and Mental Health

There is growing awareness of negative associations between smartphone use and mental health. In a large-scale survey of American high school students and their leisure activities, researchers found that all activities associated with higher depressive symptoms or suicide-related outcomes involved screens, whereas those associated with lower depressive symptoms or suicide-related outcomes did not involve screens [1]. In addition, the researchers note that depression, suicide attempts, and suicide deaths among adolescents rose significantly during the 2010s, despite decades of improvement. They attribute this dramatic reversal in mental well-being to the proliferation of smartphones.

Practitioners, including the design ethicist Tristan Harris, make similar arguments. Harris claims that smartphones “hijack” and “exploit our minds’ weaknesses,” distracting us

from life and making us less happy [2]. Along these lines, research has found that the presence of a cellphone can diminish the perceived quality of face-to-face social interaction, impair performance on cognitively demanding tasks, and reduce productivity at work, school, and home [3].

Despite these preliminary results, the relationship between smartphone use and mental health is not well-understood. In fact, the association between smartphone use and mental health may be much weaker than some scholars claim; another large-scale survey of adolescents found that the association between smartphone use and mental health explains at most 0.4% of variation in well-being [4].

Moreover, because contemporary research relies on cross-sectional studies instead of randomized control trials, scholars have been unable to demonstrate that smartphone use causes mental health issues. Proposed causal mechanisms include upward social comparison on social media, cyberbullying, online information about self-harm, and displacement of in-person social interaction and sleep (e.g., smartphone use in bed is correlated with sleep disturbances and depression) [5].

Another key limitation of contemporary studies is that they lack granular data to understand usage in detail. Retrospective surveys provide researchers with only the broad strokes of what smartphone use looks like (e.g., aggregate screen time), rather than what users are seeing and doing on their phones moment to moment [6]. Nonetheless, we already know that different patterns of use are associated with different mental health outcomes. For example, moderate smartphone use is associated with greater mental health than very little or very much smartphone use. Non-social smartphone use (e.g., news, entertainment) is more associated with depression and anxiety than social use (e.g., social media, messaging) [7]. And weekend use is associated with greater self-reported mental well-being than weekday use [8].

Furthermore, it is clear that some users suffer from “problematic” use. The precise symptomology is under debate, but problematic use refers to a maladaptive preoccupation with smartphone use, experienced as prolonged bouts of seemingly

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uncontrolled use. Problematic use is associated with significantly higher risk of mental health issues including depression and anxiety. It can also lead to financial problems, dangerous use (e.g., texting while driving), impaired relationships, and diminished academic performance [9]. Prevalence of problematic smartphone use is unknown in the total population. However, a recent large-scale meta-analysis of children and young people found that approximately one in every four young people suffers from problematic use [10].

Problematic smartphone use is often conceptualized as a behavioral addiction to phone use itself, not necessarily as an addiction through the phone to something else (e.g., gambling disorder, compulsive shopping). Within this framework, problematic smartphone use is often characterized by tolerance, withdrawal, uncontrolled use, wasted time as a result of use, negative impacts on personal, professional, or social spheres, and consciousness of dysfunction. However, there is little evidence for tolerance and withdrawal symptomatology as it relates to smartphone use, and limited evidence of neurobiological similarities between phone “addiction” and other addictive behaviors [9]. Further research is needed to support the addiction framework. In particular, researchers must avoid the trap of assuming a priori that problematic use is an addiction (e.g., focusing on risk factors implicated in addiction).

Little is known about what drives problematic use. The most common hypothesis, in line with the addiction framework, is that problematic use occurs when users rely on their smartphones to alleviate negative emotions. Instead of using more adaptive coping strategies, like cognitive reappraisal or face-to-face social support, problematic users use their smartphones to distract, avoid, and disengage [11]. The mood enhancement from smartphone use leads to conditioning: individuals are attuned to small cues (like notification messages) that reward use, ultimately leading to compulsive use.

A promising alternative hypothesis, outside of the addiction framework, highlights diverse pathways to problematic use: excessive reassurance, impulsivity, and extraversion. Under this conceptualization, risk factors for problematic use include low self-esteem, insecure attachment, social anxiety, neuroticism, general anxiety, antisocial personality, attention deficit/hyperactivity disorder, low self-control, sensation-seeking, extraversion, reward sensitivity, and reward dependence. For instance, an individual with low self-esteem and an anxious attachment style might worry that his girlfriend will leave him as soon as she finds someone better. He might constantly check his phone for text messages from his girlfriend, seeking reassurance that this catastrophe has not yet happened [9]. The smartphone becomes a self-reinforcing conduit for maladaptive thinking and behavior. Other hypotheses about problematic smartphone use stress similarities with impulse control and obsessive compulsive disorders.

The nature of problematic smartphone use—whether it is an addiction, or it reinforces and stacks on top of other

psychological issues, or is something else entirely—has clear implications for treatment. Addiction-based approaches may not be relevant. But limited progress has been made in applying traditional techniques like CBT to problematic smartphone use, or in developing new approaches for targeting underlying psychological issues in the context of problematic use. Moreover, clinicians underrecognize the prevalence of problematic smartphone use and its impact on patients seeking psychiatric care. Few clinicians are trained to deal with problematic smartphone use, and screening for problematic use in clinical settings remains rare.

Problematic smartphone users cannot simply abstain from their phones. Smartphones are ubiquitous, convenient, and often necessary for daily life. Thus, problematic users must learn to live with their phones in healthier ways. This is can be a serious challenge. Heavy use is an intrinsic goal of many technology businesses. Many of these companies spend tremendous resources explicitly designing their products to maximize use (e.g., infinite newsfeeds), raising ethical questions about responsibility for problematic use in vulnerable populations. Moreover, the relationship between smartphone use and mental health remains undertaught in medical training. Most medical students graduate without ever learning about problematic use. This means that most problematic users struggle with problematic use on their own, outside the sphere of academic medicine.

In summary, despite negative associations between smartphone use and mental health, primarily in relation to problematic use, smartphone use remains understudied by academic physicians and underrecognized by clinicians. Going forward, academic psychiatry must help to answer key questions in the research literature and incorporate new knowledge into medical training and clinical practice. Academic psychiatry must also promote healthy smartphone use, use smartphones to improve, and improve understanding of ethical issues related to problematic use.

The Path Forward

Improving Research

More and better research is needed into the pathophysiology, etiology, epidemiology, natural course, and treatment of problematic smartphone use. The most basic and important questions about smartphone use and mental health remain unanswered: Do smartphones cause mental illness? Can limiting smartphone use improve mental health? Is problematic smartphone use a behavioral addiction? How can vulnerable individuals use smartphones without succumbing to problematic use or dangerous behaviors? Does problematic smartphone use belong in the *Diagnostic and Statistical Manual of Mental Disorders*?

To answer these questions, academic medicine must avoid pitfalls that have so far plagued the literature: reliance on retrospective report, convenience sampling (e.g., Amazon Mechanical Turk, oversampling of undergraduates who display no signs of cognitive or emotional impairment), and *a priori* assumptions about the nature of problematic use. Going forward, the best research will be longitudinal, experimental, and ecological (i.e., it will collect granular, real-time smartphone use data). It may also incorporate neurobiological data, which so far has been entirely missing from the literature.

Improving Medical Training

Medical schools and residency programs must ensure that psychiatrists better understand the relationship between smartphone use and mental health. Given the likely prevalence of problematic use and its implications for mental health, clinicians must be taught the symptoms, causes, and treatment options related to problematic use. More broadly, understanding the relationship between technology use and mental health will be a key pillar of the twenty-first century academic psychiatry.

Academic medicine can also make better use of smartphones as a tool for improving psychiatry education. Smartphones are an inexpensive and relatively underutilized mechanism for collecting resident feedback and tracking class attendance [12]. Smartphones enable residents to receive more feedback on their performance and make it easier for supervising physicians to provide such feedback. This leads to more conversations with supervisors about performance and more learning [13]. Also, educational smartphone apps allow students to learn remotely and to quickly find evidence-based information. Universities and healthcare organizations can create their own “in-house” apps addressing current shortfalls in clinical education [14].

Improving Clinical Care

Clinicians must do more to screen for problematic use. Scholars currently measure problematic use via a plethora of surveys including the Smartphone Addiction Scale and Mobile Phone Problem Use Scale, but it is not clear if these measures are clinically useful. Clinicians should align on a reliable and valid way of measuring problematic smartphone use.

Clinicians must also advance the treatment of problematic use. Currently, there is no playbook for treating problematic use on its own or in conjunction with other mental health issues like depression or anxiety. CBT and therapies targeted at underlying psychological factors may prove more useful than addiction-based approaches.

Smartphone-based solutions (e.g., restrictions on screen-time, screen-time tracking, specialized apps that target problematic use, “light” phones that support only a small number of simple functions like texting) may also prove useful, especially when designed in conjunction with clinicians. There is potential for “fighting fire with fire”—treating smartphone-based issues with smartphone-based solutions. Meta-analyses have already shown that smartphone-based interventions can improve physical diseases, such as diabetes, and mental health conditions like depression and anxiety [15]. Smartphone-based digital phenotyping—continuous, objective, passive, real-time assessments of mood, behavior, and cognition—also holds promise in improving the diagnosis and treatment of mental illness.

Improving Public Education

Academic medicine can also do more to educate the public about the relationship between smartphone use and mental health. Articles in the popular press commonly refer to smartphone addiction as an “epidemic,” and claim that our “iPhones are making us depressed” [16, 17]. Unfortunately, these articles are often misleading. Academic medicine and clinicians should counter such reports with the latest research. Academic medicine and clinicians should also provide guidance on how to use smartphones in healthy ways (e.g., sleep-hygiene recommendations, changing workplace expectations that require people to respond immediately to online communications).

Ethics

Academic medicine can help answer ethical questions about the role of businesses such as Apple or Google in enabling problematic smartphone use. How should we think about problematic use? Is a voluntary risk framework appropriate? The answers to these questions have important public health and public policy implications.

In conclusion, academic psychiatry must take steps to advance research related to smartphone use, promote awareness of the impact of smartphone use on mental health, address smartphone use in clinical care, and improve understanding of ethical issues related to problematic use.

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Compliance with ethical standards

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