CNS Spectrums (2019), **24**, 371-373.
doi:10.1017/S109285291800127X

PERSPECTIVES

Problematic Internet use two decades later: apps to wean us off apps

Elias Aboujaoude *

Department of Psychiatry and Behavioral Sciences, Stanford University School of Medicine, Stanford, California, USA

Two decades of research into problematic Internet use have not yielded an established definition, much less an accepted treatment algorithm that is based on the psychopharmacological and psychotherapeutic interventions that have been tested. Meanwhile, technology-mediated tools that purport to curb unnecessary use of Internet-related technologies and the associated negative consequences are gaining in popularity, despite the lack of rigorous clinical trials into their efficacy and safety. Some popular new offerings that vary in browser, operating system and platform compatibility are reviewed. While they share similar goals as "traditional" treatments, they may be more efficient, scalable, and affordable. Using technology against itself may be counter-intuitive, but the popularity of these tools and their potential advantages make them worthy of researchers' attention. Telepsychiatry platforms, which are gaining a foothold in the treatment of established disorders, may, paradoxically, also prove beneficial for the management of problematic use of Internet-related technologies.

Received 11 June 2018; Accepted 14 August 2018; First published online 29 October 2018

Key words: Apps, Internet addiction, Internet gaming disorder, nomophobia, problematic Internet use, smartphone, telemental health, telepsychiatry.

The debate about what constitutes problematic use of Internet-related technologies has continued for nearly 2 decades, as has the exploration of possible treatments.[1,2] Both psychopharmacological and psychotherapeutic interventions have been tested, inspired by established treatments for conditions to which Internet-related psychopathology has been linked, such as obsessive-compulsive disorder, substance use disorders, behavioral addictions, and attention-deficit and hyperactivity disorder.[3] As such, cognitive behavioral therapy,[4] selective serotonin reuptake inhibitors,[5] mu receptor antagonists,[6] stimulants,[7] and residential detoxification and rehabilitation programs[8] have received research attention, with some promising results but no definitive treatment algorithm emerging. Meanwhile, concern about the psychological, cultural, and sociopolitical consequences of a heavily Internet-reliant lifestyle has only grown, contributing to the rise of a new industry and an altogether different family of interventions being adopted by legions of users. Promoted by nonprofits,[9] the tech sector,[10] and media groups,[11] new apps that are designed to help wean users off apps have ushered in a new era that goes beyond traditional psychopharmacology and psychotherapy. Seemingly more aligned with mobile therapy and other telepsychiatry solutions,[12] these interventions have received little formal testing by mental health researchers and only minimal scientific scrutiny. At 20, "Internet addiction" has paradoxically become a condition whose treatment is being sought online, with precious little evidence-based guidance available.

Several products purport to curtail unnecessary online activity, with choices that cover various operating systems and platforms. Purveyors also vary from nonprofits offering free software to technology startups whose business model is to bring to the market anti-technology products. *Moment*[13] is a smartphone app that tracks the time spent on popular apps, allowing the user to establish daily limits and be notified when those limits are exceeded. A family plan gives the option of setting up screen-free family meal times during which device use by any family member will result in an "annoying alert" that all plan members hear. A small, one-time fee unlocks special features, such as setting up a daily limit and screen-free time.

Flipd[14] is another mobile app that restricts phone use, in part by setting a timer that locks the user out of all

* Address for correspondence, Elias Aboujaoude, MD, MA, Clinical Professor, Department of Psychiatry and Behavioral Sciences, Stanford University School of Medicine, Stanford, CA 94305, USA.
Email: eaboujaoude@stanford.edu

functions except essential calls and text messages. For a modest annual fee, it claims to have helped adopters spend "100 million minutes distraction-free" and is seeking a foothold in the classroom by marketing directly to educators and students.

The app *Thrive*[15] also aims to curb phone use. Enabling the app's Thrive Mode blocks all apps, notifications, calls, and texts, except from individuals on a "VIP list" that is synced with the user's Favorites contacts list. An Auto Reply function explains that the person is taking time away from the phone, and when to expect a response. A blocking function allows the user to disable problematic apps once a preset threshold is reached, and until 12AM the following day.

Still in beta testing, *Siempo*[16] is an app that replaces the standard phone home screen with a less distracting interface, unbrands icons to make them less recognizable, batches notifications to send at a user-determined time interval, and uses a menu that separates important tools (eg, calendar, maps, notes) from potentially time-wasting social media and other non-essential apps.

Freedom,[17] which boasts over 650,000 users, and *RescueTime*[18] both temporarily block specific websites deemed problematic by the user, and the free browser extension *uBlock Origin*[19] prevents distracting third-party ads, as well as trackers and malware, from accessing the browser. A harm reduction approach can be said to inspire *F.lux*,[20] software that matches display brightness with circadian rhythm, ostensibly making late-night exposure to screen light less disruptive to the sleep cycle.

While the most popular apps, software add-ons, and program extensions (Table 1) vary in operating system (iOS, Android, Mac, Windows), browser (Internet Explorer, Chrome, Safari, Firefox), and device (desktop, tablet, phone) compatibility, they share an important feature. Collectively, they represent novel ways in which technology is being used against itself, with an ultimate goal that is consistent with that of early psychopharmacological and psychotherapeutic trials in the field—controlling excessive use of Internet-related technologies and limiting the associated negative impact, including time loss; distractibility; interference in professional, personal, or academic life; and isolation. They also represent more sophisticated and deliberate tools than the leveraging of already built-in features to limit screen time (eg, using a phone's grayscale functionality,[21] which is meant to preserve battery power, to make colorful app icons less noticeable; disabling notifications, banners, and badges to get rid of attention-commanding alerts; and turning Nigh Shift mode[22] on, which moves an iOS phone's display colors to the warmer end of the color spectrum, considered less disruptive to sleep) (Table 2). The popularity of these tools suggests recognition by many online users of Internet-related distractibility or other psychological problems, and a willingness to leverage technology to mitigate problems borne out of a technology-saturated lifestyle. Compared to traditional psychotherapy or psychopharmacology, these tools may possess some advantages, including scalability, cost savings, convenience, reduced stigma, and a lack of side effects. They are also easier to target to the audience of online users who may benefit from them. However, as a group, they lack serious scrutiny in the form of rigorous clinical trials. Such scientific exploration would seem warranted in light of the potential advantages, but also to ascertain safety, given that these tools already seem to be in wide use. To that end, Apple's recent announcement[10] of a digital health initiative centered on an app that promises to provide time tracking, a "do not disturb" function, and parental controls, is likely to produce a further mainstreaming of these tools. While it would be unlikely for an app blocker to be "unsafe," marketing it without sufficient clinical testing risks causing individuals with serious internet-related mental health problems to eschew traditional evaluation and treatment in

TABLE 1. Downloadable apps and other software to limit screen time or mitigate its effects[9]

Software	Purpose
Moment[13]	Tracks screen time; allows user to set daily limits; offers "family plan."
Flipd[14]	Timer can lock user out of non-essential phone functions; focused on classroom.
Thrive[15]	Limits interactions with those not on user's Favorites list; disables problematic apps at preset threshold; auto-reply explains user's lack of response.
Siempo[16]	Replaces home screen with less distracting interface; unbrands icons; batches notifications; separates essential tools from other apps.
Freedom[17]	Blocks sites deemed problematic by the user.
RescueTime[18]	Blocks sites deemed problematic by the user.
uBlock Origin[19]	Blocks sites deemed problematic by the user; blocks third-party ads, trackers, and malware.
F.lux[20]	Reduces exposure to sleep-disrupting blue light.

TABLE 2. Leveraging smartphone features to limit screen time or mitigate its effects[9]

Feature	Suggested use
Grayscale[21]	Makes apps and alerts less noticeable.
Notifications	Disabling them can reduce distracting alerts.
Home screen	Limiting it to necessary tools (maps, calendar, etc) reduces time spent on apps.
Audio messaging	Saves time spent typing (and is less likely than texting to cause confusion).
Social media apps	Deleting them from the phone and checking social media on computers only reduces total time online.
Phone alarm	A separate alarm clock obviates need for phone in bedroom and reduces use.
Night Shift[22]	Reduces exposure to sleep-disrupting blue light.

https://doi.org/10.1017/S109285291800127X Published online by Cambridge University Press

favor of inadequately tested software. And that could pose safety risks.

The telepsychiatry revolution has brought computerized cognitive behavioral therapy, online video-based therapy, virtual reality exposure therapy, and mobile text-based therapy to the treatment of mood disorders, anxiety disorders, and phobias.[12] If clinically proven, apps that wean individuals off apps might be similarly considered successful examples of telepsychiatry, succinctly defined as the technology-mediated delivery of mental health care.[12] Although many would not have seen problematic Internet use as a logical target for telepsychiatry, "Click here if you are addicted to the Internet" might prove a legitimate strategy. Research is clearly needed to settle this question via studies that test these tools on their own as they are being advertised, or as part of a larger behavioral or other "traditional" intervention.

Meanwhile, keen attention to conflicts of interest and motives should accompany the assessment of anti-technology products released by technology companies. A digital company's financial health often correlates with the amount of time consumers spend in front of the screen engaging with its products, so initiatives that aim to help users disconnect would seem to pose an inherent conflict that deserves to be dissected. Finally, with consumers,[23] shareholders,[24] and regulatory bodies[25] now demanding more oversight of technology companies in light of privacy and other violations, vigilance is required regarding possible public relations maneuvers masquerading as health campaigns.

Disclosures

Dr. Aboujaoude reports other from Limbix Health, outside the submitted work.

REFERENCES:

1. Starcevic V, Aboujaoude E. Internet addiction: reappraisal of an increasingly inadequate concept. *CNS Spectr*. 2017;**22**(1):7–13.
2. Kuss DJ, Lopez-Fernandez O. Internet addiction and problematic Internet use: a systematic review of clinical research. *World J Psychiatry*. 2016;**6**(1):143–176.
3. Aboujaoude E. Problematic Internet use: an overview. *World Psychiatry*. 2010;**9**(2):85–90.
4. Young KS. Treatment outcomes using CBT-IA with Internet-addicted patients. *J Behav Addict*. 2013;**2**(4):209–215.
5. Dell'Osso B, Hadley S, Allen A, *et al*. Escitalopram in the treatment of impulsive-compulsive internet usage disorder: an open-label trial followed by a double-blind discontinuation phase. *J Clin Psychiatry*. 2008;**69**(3):452–456.
6. Bostwick JM, Bucci JA. Internet sex addiction treated with naltrexone. *Mayo Clin Proc*. 2008;**83**(2):226–230.
7. Han DH, Lee YS, Na C, *et al*. The effect of methyphenidate on Internet video game play in children with attention-deficit/hyperactivity. *Compr Psychiatry*. 2009;**50**(3):251–256.
8. Sakuma H, Mihara S, Nakayama H, *et al*. Treatment with the Self-Discovery Camp (SDiC) improves Internet gaming disorder. *Addict Behav*. 2017;**64**:357–362.
9. Center for Humane Technology. Take control of your phone. http://humanetech.com/take-control. Accessed May 30, 2018.
10. Apple. iOS 12 introduces new features to reduce interruptions and manage screen time. https://www.apple.com/newsroom/2018/06/ios-12-introduces-new-features-to-reduce-interruptions-and-manage-screen-time. Accessed June 10, 2018.
11. Techcrunch. Arianna Huffington's Thrive Global raises $30M so you can work less and sleep more. https://techcrunch.com/2017/11/29/arianna-huffingtons-thrive-global-raises-30m-so-you-can-work-less-and-sleep-more. Accessed June 10, 2018.
12. Aboujaoude E, *et al*. Telemental health: a status update. *World Psychiatry*. 2015;**14**(2):223–230.
13. Moment. https://inthemoment.io. Accessed May 30, 2018.
14. Flipd. http://www.flipdapp.co/#features. Accessed May 30, 2018.
15. Thrive. https://play.google.com/store/apps/details?id=com.thriveglobal.thriveapp&hl=en_US. Accessed May 30, 2018.
16. Siempo. https://play.google.com/store/apps/details?id=co.siempo.phone&hl=en_US. Accessed May 30, 2018.
17. Freedom. https://freedom.to. Accessed May 30, 2018.
18. RescueTime. https://www.rescuetime.com. Accessed May 30, 2018.
19. uBlock Origin. https://www.extremetech.com/internet/214151-ad-blocking-for-the-masses-part-one-ublock-origin. Accessed May 30, 2018.
20. F.lux. https://justgetflux.com. Accessed May 30, 2018.
21. Bowles N. Is the answer to phone addiction a worse phone? *The New York Times*. https://www.nytimes.com/2018/01/12/technology/grayscale-phone.html. Accessed May 30, 2018.
22. Gould G, Loria K. Here's why the iphone's Night Shift is such a big deal. *The Independent*. https://www.independent.co.uk/life-style/gadgets-and-tech/smartphone-iphone-apple-night-shift-mode-tim-cook-technology-silicon-valley-a8139701.html. Accessed May 30, 2018.
23. Quirk MB, St. John A. How to quit Facebook. *Consumer Reports*. https://www.consumerreports.org/social-media/how-to-quit-facebook. Accessed June 10, 2018.
24. Brian F. Apple face a shareholder backlash over what the iPhone may be doing to our kids. *The Washington Post*. https://www.washingtonpost.com/news/the-switch/wp/2018/01/08/apple-faces-a-shareholder-backlash-over-what-the-iphone-may-be-doing-to-our-kids/?utm_term=.56d731245376. Accessed June 10, 2018.
25. Hsu T, Kang C. Demand grows for Facebook to explain its privacy policies. *The New York Times*. https://www.nytimes.com/2018/03/26/technology/ftc-facebook-investigation-cambridge-analytica.html. Accessed June 10, 2018.

https://doi.org/10.1017/S109285291800127X Published online by Cambridge University Press