

Internet addiction disorder and youth

There are growing concerns about compulsive online activity and that this could impede students' performance and social lives

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Although 'Internet addiction disorder' is not officially recognized as a disorder by the psychiatric community—it was not included in the recently released Diagnostic and Statistical Manual of Mental Disorder V (DSM-V), published by the American Psychiatric Association—an alarming number of people show what appear to be signs of addiction to the digital world. Young people seem especially vulnerable, with case studies highlighting students whose academic performance plummets as they spend more and more time online. Some also suffer health consequences from loss of sleep, as they stay up later and later to chat online, check for social network status updates or to reach the next game levels.

There have been a number of tragic cases that have grabbed headlines and heightened the public's concerns about compulsive Internet use. A young couple in Korea, for example, spent so much time raising a virtual daughter online that they neglected their own actual daughter, who eventually died. In China, two students from Chongqing who had been playing an online game for 2 days straight passed out on railroad tracks and were killed by an oncoming train. While it is presumptuous to blame 'Internet addiction' for such tragedies—the young people involved may have suffered from other pathologies that led to such negative outcomes—the cases certainly draw attention to the darker side of Internet use.

Putting aside for a moment the debate over whether such problems should be framed as 'Internet addiction disorder', research into these behaviors has grown dramatically since the mid-1990s, particularly as more and more cases among college students have come to the attention of university health professionals. Besides 'Internet addiction', terms such as 'problematic Internet use', 'dysfunctional Internet

use', 'Internet dependency', 'pathological Internet use', and 'compulsive Internet use' have been proposed as ways to describe these behaviors. For this article, I will employ 'Internet addiction' because it is widely used in the research, but I will come back to the question of nomenclature.

How prevalent is Internet addiction among students? Studies in different countries have generated widely different estimates: A study in Italy, for example, found very low incidence (0.8%) [1], while prevalence rates as high as 18% have been reported in the UK [2]. A recent review found that over 12% of male students and 5% of female students in China showed signs of Internet addiction [3]. Internet addiction is more widespread than just on university campuses where laptops and computer labs are within easy reach; it is also being seen in high school and middle school students. One longitudinal study of Hong Kong high-school students reported prevalence rates as high as 26.7% [4].

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A major challenge to our understanding of these prevalence rates is that there are many different instruments used to assess addictive behavior [5]. Most researchers began approaching Internet addiction using

clinical screening techniques that rely on self-report questionnaires designed to distinguish pathological subjects from normal people. Early assessments drew on the diagnostic criteria for substance abuse, for instance, which include criteria such as tolerance, withdrawal symptoms, use of the substance in larger amounts over a longer period than intended, persistent desire for the substance, and negative outcomes. Translating these into criteria that could distinguish Internet addicts by substituting 'Internet' for 'substance' led to somewhat awkward characterizations. For example, one early attempt defined tolerance as a “need for markedly increased amounts of time on Internet to achieve satisfaction”, and “markedly diminished effect with continued use of the same amount of time on Internet” (<http://www.urz.uni-heidelberg.de/Netzdienste/anleitung/wwwtips/8/addict.html>).

Other surveys draw on the characteristics of pathological gambling, now called 'gambling disorder' in DSM-V, which also bears a resemblance to the kind of behavior we see in students who show problematic Internet use. Again, the surveys often simply swap the words 'Internet use' for 'gambling'. Young's Diagnostic Questionnaire, for example, contains eight yes-or-no items drawn directly from the criteria used to identify pathological gamblers. One question asks: “Do you feel restless, moody, depressed, or irritable when attempting to cut down or stop Internet use?” Another asks, “Have you lied to family members, therapist, or others to conceal the extent of involvement with the Internet?” This survey was later expanded to a 20-item questionnaire, called the Internet Addiction Test (IAT) with a five-point scale so that subjects could indicate the extent to which they engage in behaviors that suggest addiction. For most

of the surveys, researchers have established cutoff scores to categorize respondents as either normal Internet users, or as addicted to at least some degree.

With so many different measures in place—not just to identify different characteristics, but also to adapt the surveys to different cultures—it is hardly surprising that prevalence rates vary so much. A single individual might be classified as addicted in one study and normal in another, depending on the survey used.

Another problem is that many of the questions are becoming obsolete and somewhat misleading because of the increasing trend for 24/7 connectedness. For instance, a question on the IAT asks: “How often do you form new relationships with fellow online users?” One might argue that answering ‘often’ could indicate a healthy ‘hybrid’ social life in which the student is expanding his or her network of friends and acquaintances through social media. Many universities actually encourage this kind of networking to build relationships among incoming students and help them to avoid loneliness. A ‘diagnosis’ of Internet addiction could therefore be mistakenly conflated with socially or professionally beneficial use of the time spent online.

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Several surveys also try to assess addiction simply by using the amount of time spent online, but students are connected to the Internet virtually all the time now, either through Wi-Fi or their mobile phone contracts. Students also rely heavily on the Internet to study, read news, communicate and entertain themselves. They multitask as they watch a football game or (sadly) attend class. Watching TV, they ‘multi-screen’ and tweet to their friends about the show they may all be watching from their dorm rooms or apartments. And with Netflix, Hulu, and other Internet-based on-demand entertainment, they may be online in many different ways. The Internet is no longer something that we ‘log into’ for

particular durations of time, sitting in front of a desktop computer.

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A bright spot for the growing body of research that relies on these different measuring instruments is that the underlying dimensions they emphasize appear to be converging. A study of fourteen such instruments found that most of them heavily weigh *negative outcomes* and *compulsive use* as key features for identifying Internet addiction [6]. This emphasis is less likely to award high scores to today’s students who are online most of the day and who rely on social media to maintain and expand their network of friendships. Instead, the improved surveys will identify people who are experiencing negative effects, or who want to get ‘off the grid’ but are unable to control themselves. The convergence in the dimensions also indicates that there is growing agreement about the definition of Internet addiction disorder and a clearer understanding of its most important symptoms. There is no question that 21st century youth have become far more dependent upon connectivity for studying, playing, communicating, and socializing. We all have. But it is a mistake to mislabel this as addiction, and the

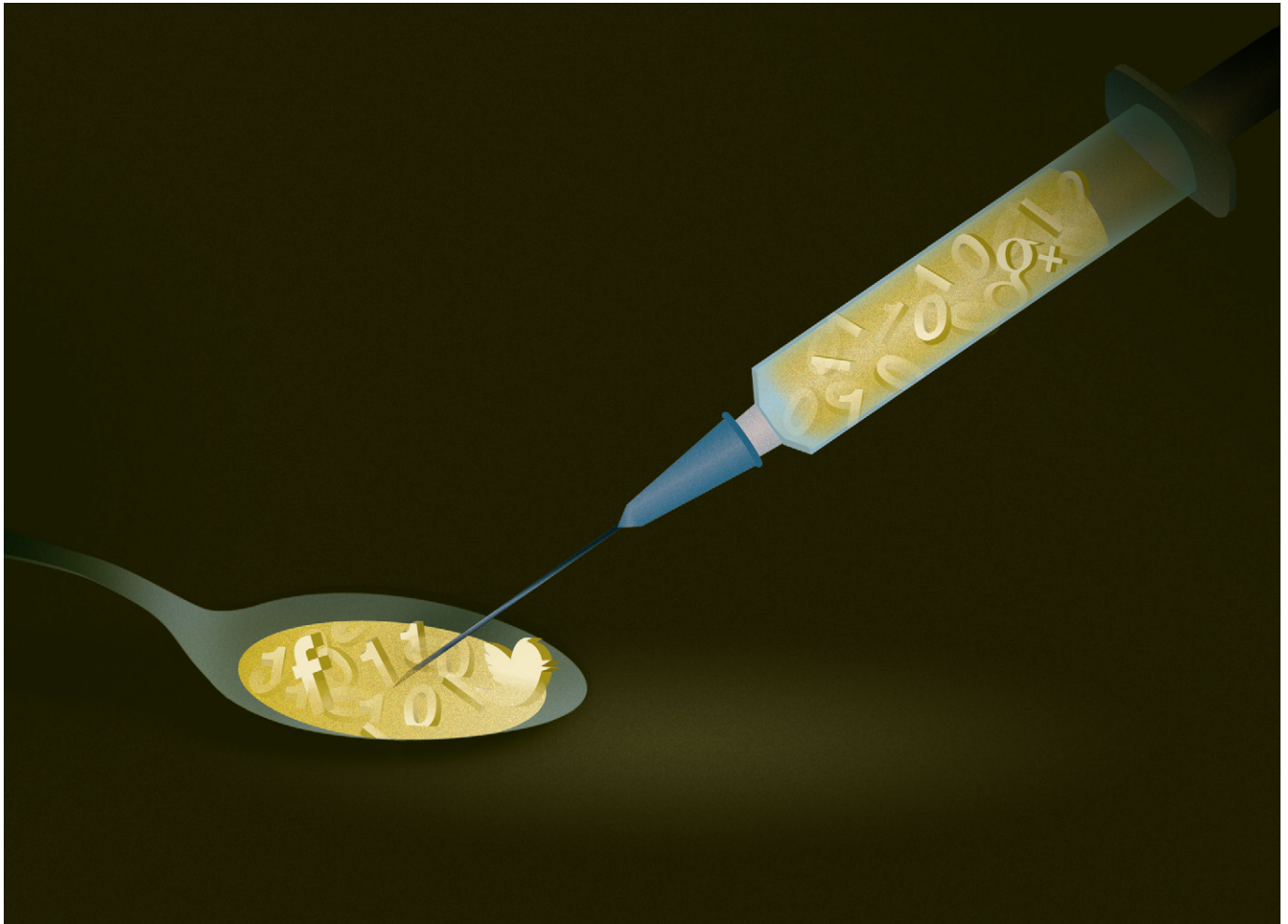
emphasis on negative outcomes and compulsive use is therefore a helpful distinction (Table 1).

What are the risk factors associated with Internet addiction in students? Being male is one, as most studies find a higher rate among adolescent and young adult males compared to females. Low self-esteem appears frequently, along with depression, hostility and emotional instability. In some cases, people classified as addicted to the Internet show comorbid conditions, such as depression, obsessive-compulsive symptoms, and alcohol abuse. It is not clear how these factors are related in terms of cause and effect. For example, poor impulse control might lead to problematic use of the Internet along with alcohol or drugs. Depression and low self-esteem might lead students to escape into online fantasy worlds, where they have more control over their virtual identities and can craft their ideal personas. Depression and low self-esteem might also be the result of being unable to control one’s online activities, or both. The relationships among these different factors are likely to be complex and bi-directional.

Preliminary studies that investigate how neural activity and chemistry relate to Internet addiction report a number of intriguing findings. For example, compulsive Internet users show different activity patterns in regions of the brain that have been implicated in reward and emotion processing. They also show decreased grey matter volume in several regions [7]. Findings from functional magnetic resonance imaging suggest that adolescents with Internet addiction have decreased brain functional connectivity [8].

Table 1. What do surveys that attempt to identify Internet addiction actually measure? The table shows the dimensions in descending order of emphasis, along with sample survey items.

	Dimension	Sample item
1	Negative outcomes	Going online has negatively affected my schoolwork or job performance.
2	Compulsive use	I have attempted to spend less time online but have not been able to.
3	Saliency	Do you feel preoccupied with the Internet (think about previous online activity or anticipate next online session)?
4	Mood regulation	I have gone online to make myself feel better when I was down or anxious.
5	Social comfort	I feel safer relating to people online rather than face-to-face.
6	Withdrawal symptoms	I feel distressed or down when I stop using the Internet for a certain period of time.
7	Escapism	Do you use the Internet to escape from sorrows or get relief from negative feelings?



Anatomically, one study found reduced cortical thickness in the orbitofrontal region among boys diagnosed with Internet addiction compared to normal children [9]. Several of these differences in brain activity and neurochemistry align with similar differences that have been found between people who have chemical addictions and healthy controls. Similar patterns also appear in people with gambling disorders, which is one reason why gambling disorder is grouped under the heading ‘Substance-Related and Addictive Disorder’ in DSM-V. It is tempting to hypothesize that so-called ‘behavioral addictions’ share brain mechanisms with other addictive disorders involving substances. If these parallels are confirmed, behavioral addictions might actually be a better model for understanding addictive behavior compared to substance addictions, because they do not involve toxic chemicals that cause their own effects on brain and behavior.

Given all these confounding factors, is ‘Internet addiction disorder’ the right term? Even if it is now widely used, some argue that it is misleading and should be abandoned [10]. One of the challenges to understanding problematic Internet use is that the net offers an enormous range of activities, and the environment itself and its underlying technologies keep changing and growing. In some cases, people who appear to be addicted to the Internet are really addicted to something else—gambling, for example—and they are only using the net as a delivery mechanism. In other cases, the online activities might be available offline, but they unfold differently in the online world where the safety of physical distance and perceptions of anonymity are more salient. Cybersex and cyberbullying are examples. The nature of many online environments easily leads to more disinhibited behavior.

The term ‘Internet addiction’ may have made sense in the 1990s, when Internet

users were few and their choices were limited mainly to surfing, email, discussion forums and Usenet groups, a few games, and some text-based ‘multi-user dimensions’ (MUDs). Then, people ‘went online’ by dialing a phone number and connecting their computer to a modem. Facebook did not exist, nor did any of the massive multi-player online role playing games (MMORPGs) with millions of users and breathtaking 3D graphics. Mobile phones were expensive and not widespread, especially not among students.

Now, we see problematic Internet use for many different reasons. A plethora of online environments offers a multitude of experiences from a psychological perspective, each with compelling features that can lead to problem behavior [11]. The extraverts might find themselves spending much more time than they intended on Facebook, compulsively checking in every 15 min to see how many ‘likes’ their latest post

earned. For people with a narcissistic bent, Facebook and Twitter may become cavernous time sinks as they are constantly expanding their site with ‘selfie’ photos and comments, and actively seeking to expand their growing audience. Social anxiety can also be a driver for excessive Internet use. The fear of missing out—‘FOMO’—can be a primary reason some students check their social media hundreds of times, both day and night. Indeed, frequent Facebook use tends to reduce feelings of well-being in adolescents, rather than making them feel more connected and less socially anxious [12].

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Gaming is another main issue for young people who score high on the Internet addiction surveys. In fact, while the DSM-V did not include ‘Internet addiction disorder’, it does add ‘Internet gaming disorder’ as a condition in need of further study in Section III. Many of the studies that attempt to estimate prevalence and identify correlates of Internet addiction may actually be describing a pool of young people dominated by compulsive gamers, whose characteristics would be quite different from, for example, narcissists on Facebook. Studies that specifically investigate compulsive gamers find correlates such as loneliness, low self-esteem, aggression, hostility, and sensation-seeking [13]. Most of the boys identified as having Internet addiction in the studies that assessed brain activity were there because of gaming.

Games come in many varieties, however, and people who become addicted to one type of game may have different characteristics compared to those who play another one compulsively. Some games emphasize social rewards rather than aggression, competition, and mastery. Playing Farmville with Facebook friends, for instance, involves a lot of virtual gift-giving and cooperation; practices that help maintain social relationships. People join the

role-playing simulation called Second Life especially for social reasons. The term ‘Internet gaming disorder’ may also add confusion because people play games on many different devices, with or without a network connection.

A third online activity that may be awkwardly grouped under Internet addiction disorder involves mobile phones: the term ‘mobile phone addiction’ is sometimes used to distinguish the phenomenon. Most of the traditional surveys to assess Internet addiction do not tap problematic mobile phone use easily, so new assessments are emerging with items such as “Using my mobile phone at night influences my sleep”, or “I try to hide my mobile phone usage”. Mobile phones, of course, offer access to almost any Internet environment along with voice and video calls, text messaging, video recording, and thousands of endlessly engaging apps designed especially for the tiny screens. In addition, they add a new dimension because they are always available, unlike a desktop or even a laptop computer.

Students use mobile phones while walking to class, riding on a bus, or waiting for an elevator. These ‘micro time slots’ in which people can engage in a mind-boggling array of online activities were not previously available. That can be an enormous advantage for educators eager to draw on spaced learning to improve student learning outcomes. But obsessive smartphone checking can also interfere with face-to-face relationships and impair academic performance.

Research on problematic mobile phone use is limited, but the phenomenon is certainly attracting attention. A study of Taiwanese university women, for instance, found that students who scored high on a test of mobile phone addiction showed more social extraversion and anxiety, and somewhat lower self-esteem [14]. Women appear to be more susceptible to excessive mobile phone use than men.

A key element of mobile phones that may be a particularly important ingredient that promotes problematic behavior involves text messaging, either independently or through Twitter and similar services. Recent polls suggest teens are starting to abandon Facebook, particularly as their parents and grandparents create accounts and ask to be ‘friended’, and are turning instead to Twitter [15]. This environment is growing and

changing as well, with the recent addition of services such as Vine, which allows users to create six-second videos to share with followers.

The online environments that are most often the primary draw for problematic Internet use are specifically designed to be as sticky as possible. For example, online game companies hire data scientists to mine the ‘big data’ collected, as millions of players log in to slay monsters, buy virtual goods or interact with other avatars. The free social networks also put considerable resources into stickiness because their business models rely on an ever-growing mound of data on user behavior to share with advertisers for targeted marketing.

Regardless of the labels used to describe problematic Internet use, it is clear that concern is increasing. University educators and health staff are far more attentive to how students are spending their time online, and frustrated parents are seeking professional assistance. Treatment centers are opening in many places around the world including in China, South Korea, Taiwan, the USA, the Netherlands and the UK. Treatment approaches vary, ranging from cognitive behavioral therapies and counseling to the use of drugs normally used to treat conditions such as ADHD or depression [16]. Activity monitoring is widely used because so many patients engage in their favorite online world for far longer than they realize, as they develop ‘flow’ and time flies by. Alarm clocks and specific goal setting for controlling Internet use are also promising tools. As treatment proceeds, strategies to link improved control over Internet use to higher self-esteem are also used. To some extent, clinicians are relying on techniques used to treat other addictions because of the lack of any solid research foundation for treating ‘Internet addiction’ *per se* [17].

The speed of change on the Internet may be too fast for the kinds of controlled clinical trials that underlie treatments for other disorders. But high-tech entrepreneurs may be stepping in to offer new tools. One mobile phone app, for instance, provides activity monitoring for so-called ‘nomophobia’—the fear of being out of mobile phone contact (The name is drawn from NO MOBILE phone). The app displays statistics and charts showing how much time elapses

between each check of your smartphone screen.

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With connectivity so widespread, and tantalizing online activities constantly emerging, young people are spending more and more time online—studying, learning, communicating, creating, and entertaining themselves. That is certainly not a disorder, but for a small number it may be a slippery slope when combined with psychological and environmental variables that increase risk for addictive behavior. Similar to gambling, several online environments offer unique and compelling features that promote frequent use and can lead to signs of behavioral addiction. The variable ratio, partial reinforcement schedules programmed into slot machines maintain a very high and persistent response rate, and many online environments do the same thing. For instance, that kind of reward schedule is probably one reason young people check their smartphones so frequently for status updates or new text messages. ‘Internet addiction disorder’ may not be the right term, but the problems are very real and those students who are unable to control their online activities, whose grades drop and whose relationships with friends and family sour, definitely need help.

Conflict of interest

The author declares that she has no conflict of interest.

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