Internet Addiction: A Handbook and Guide to Evaluation and Treatment
Edited by Kimberly S. Young and Cristiano Nabuco de Abreu

PART II

Psychotherapy, Treatment, and Prevention

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CHAPTER 8

The Addictive Properties of Internet Usage

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MANY STUDIES have confirmed the existence of compulsive or addictive use of the Internet (e.g., Aboujaoude, Koran, Gamel, Large, & Serpe, 2006; Chou, Condron, & Belland, 2005; Greenfield, 1999a; Shaw & Black, 2008; Young, 2007). Young (1998a) was the first to find that excessive use of the Internet for nonacademic and nonprofessional reasons was associated with detrimental effects to academic and professional performance. Greenfield (1999b) found that approximately 6% of those who use the Internet seem to do so compulsively, often to a point of serious negative consequences. There are, however, still many questions as to appropriate nosology for the labeling of the effects of Internet abuse. Although the most popular media term currently in use seems to be *Internet addiction*, other terms that have been used include Internet addiction disorder, pathological Internet use, Internet abuse, Internet-enabled behavior, compulsive Internet use, digital media compulsion, and virtual addiction (Greenfield, 1999c). This list is by no means exhaustive, but should serve to illustrate the complexity of the current state in labeling this clinical phenomenon.

Perhaps the most accurate labels to date would be *Internet-enabled compulsive behavior* or *digital media compulsion*, as many behaviors previously associated only with the Internet have now been incorporated into many of the newer digital devices such as personal digital assistants (PDAs), iPhones, BlackBerries, MP3 players, and Internet-enabled console/portable game devices and smart phones, as well as desktop, laptop, and netbook computers. The basic psychological factors that account for the addictive nature of the Internet apply mainly to these interrelated technologies. Because the area of Internet and digital media technology is changing rapidly, it should be noted

that when referring to the Internet, all Internet-enabled digital technologies are included. The lines that define Internet use and abuse have begun to blur in that many media and entertainment technologies utilize Internet or Web-based access and therefore share many of the addictive elements that are discussed throughout this chapter.

For simplicity's sake, throughout this chapter the term *Internet addiction* will be used, and it may be inferred that all digital media devices are thereby subsumed under this label. With regard to Internet addiction, we continue to struggle with appropriate terminology. Further clarification is required to reflect the psychophysiological phenomenon of Internet addiction symptom patterns and to more accurately reflect what occurs behaviorally and physiologically when abusing Internet and digital media technology.

ADDICTIVE FEATURES OF INTERNET USE

The Internet is not completely new. It is not new in that it is not the first easily accessible, affordable, time-distorting, interactive, anonymous, and pleasurable activity we have come up with. What are new, however, are the intensity, accessibility, and availability with which all of these characteristics are utilized with Internet-enabled technologies. Toward that end, most activities (behaviors) and substances that produce pleasurable effects tend to be repeated. The consequence from a behavior being positively reinforced is what makes it likely that the behavior will be repeated. Positive reinforcement occurs when the presence of some reinforcer increases the likelihood of the preceding response (Schwartz, 1984). This pattern follows basic tenets of operant conditioning (Ferster & Skinner, 1957). It is only natural for people to increase their use (and hence abuse) of the Internet due to its pleasurable nature and reinforcement structure; this reinforcement structure will be further elaborated later in this chapter.

The neurotransmitter that seems most associated with the experience of pleasure is dopamine; we know from years of research that drugs, alcohol, gambling, sex, eating, and even exercise involve changes in this neurotransmitter (Hartwell, Tolliver, & Brady, 2009). In essence, what we become addicted to is the intermittent and unpredictable flooding of dopamine that becomes classically associated with the substance or behavior being utilized. This is where the Internet fits in.

With substance or alcohol abuse or dependence there are other factors, including physiological intoxication, tolerance, and withdrawal. We also know there are physically damaging results from drug or alcohol abuse. The Internet shares some but not all of these features and contains several new and unique characteristics as well. With Internet addiction we may see aspects of tolerance and withdrawal with concomitant physical discomfort (mostly in the form of anxiety-like symptoms or elevated irritability) when patients remove or alter their Internet use patterns. Many patients report such withdrawal symptoms when discontinuing or decreasing their use of the Internet

and other digital media technologies; often such symptoms and reactions are corroborated by close family members and friends.

Before discussing Internet addiction in more depth, a review of some general constructs of addiction is in order. The term *addiction* does not typically appear in the psychiatric, psychological, or addictions nomenclature. Rather, the more commonly accepted terms are *abuse* and *dependence*, with the latter marked with features of tolerance and withdrawal along with other markers of physiological habituation. To meet the criteria for what might closely resemble a substance-based addiction, there must be: (1) engaging in an intoxicating/pleasurable behavior (with an intention to alter mood and consciousness), (2) a pattern of excessive use, (3) negative or deleterious impact in a major sphere of living, and (4) the presence of tolerance and withdrawal features. There are other markers as well, but these are the most significant, comparable to compulsive gambling or other impulsive control disorders (Young, 1998b).

Regardless of how we label the problem, there appears to be several central hallmarks that represent this clinical syndrome. The highlight of the Internet *addictive* or *compulsive* pattern would involve not only the presence of tolerance (requiring more time online, greater or varying degrees of stimulating content, or more frequent use) but also the presence of some form of withdrawal pattern. This withdrawal pattern for Internet addiction involves a heightened state of psychological and physiological arousal and discomfort when separated from the Internet. These behaviors have been observed both in objective observation as well as by subjective self-report by many patients.

Another important criterion involves using the Internet for psychoactive or intoxicative purposes in order to alter mood or consciousness. With regard to the Internet, there are two intoxicative components. First, we have the actual *hit* or dopamine elevation, and second, we have intoxication in the form of the imbalance or avoidance in the rest of one's life. This would manifest as an impact on one or more major spheres of living (e.g., relationships, work, academic performance, health, finances, or legal status). If the Internet use does not impact a major living sphere, then it is probably not an issue that would warrant the designation as an addiction; however, many individuals don't abuse these technologies to the point where a serious impact occurs but do experience a *life-imbalance*. It is important to note that because Internet addiction is not directly a *tissue-damaging addiction*, most of the deleterious effects are due to the imbalances created by excessive time spent with the technology.

Desire to Stop, Inability to Stop, Attempts to Stop, and Relapse (DIAR)

A simple algorithm of addiction criteria that is useful is *DIAR* (Greenfield, 2009), which stands for *desire* to stop, *inability* to stop, *attempts* to stop, and *relapse* to previous use pattern. This is the pattern we often see with many, if not most, addictions. DIAR is a notable marker for Internet addiction, in addition to tolerance and withdrawal markers.

TOLERANCE AND WITHDRAWAL

Block (2007, 2008) suggests including Internet addiction in the compulsive-impulsive spectrum disorder category and argues for inclusion in the next revision of the APA *Diagnostic and Statistical Manual* (*DSM*). He argues this in part because one of the most notable factors in most addictions (dependencies), of any type, is the presence of tolerance and withdrawal. It is well documented that many, if not most, substance-based addictions involve a degree of physiological and psychological tolerance to pre-established levels of consumption; along with tolerance, some form of psychological or physiological withdrawal is typically found (Young, 1998b). The end result is that Internet addiction will be included in the DSM-V appendix for further study.

In substance-based addictions, tolerance eventually leads to the experience of physiological and psychological withdrawal symptoms when the substance is decreased or removed from use. The patient often feels a combination of uncomfortable (and at times life-threatening) physical symptoms, along with significant psychological discomfort, including anxiety, irritability, emotional lability, and alterations in mood and behavior. Internet addiction poses some unique variations on the experience of tolerance and withdrawal. With tolerance, there are several factors in the consumption (use) of Internet and other digital media technologies that seems to mimic what occurs with substance-based addictions. The addictive potential of a substance is enhanced by the rapidity of its absorption into the bloodstream; it also appears that the rapid access and short latency between clicking and receiving digital images, audio, and other content seem to increase the addictive potential of the Internet. The high speed by which the desired image or content appears seems to enhance the addictive nature of the Internet—thereby increasing the degree of withdrawal symptoms.

Withdrawal symptoms seem to vary depending on the individual, but Internet withdrawal almost always includes a degree of verbal protest at the removal of the technology, especially if said removal is done by a parent or loved one. Typically, such protestations include bouts of strong emotion, frustration, a sense of loss, separation, feeling ill at ease, and a sense of missing something. Sometimes physical expressions of anger and manipulation, coercion, or blackmail can occur. The overwhelming symptom pattern seems to be anxiety based (Young, 1998b). At times, abject disobedience may occur; this can frequently be seen in children and adolescents whose parents remove the technology. Indeed, there are many reports where children or adolescents have become physically or verbally violent when they are prohibited from Internet use.

Other withdrawal symptoms include elevations of anxiety, anger, depression, irritability, and social isolation. The difficulty with the experience of withdrawal from Internet and other digital media technologies is that it is nearly impossible to achieve a level of complete abstinence. Modern living precludes the avoidance of the Internet on a consistent basis. The desired

outcome of abstinence, which is often the goal in alcohol and substance abuse treatment, is not a practical probability with Internet addiction. Rather, what is hopefully achieved is the creation of a moderated pattern of use. This moderated pattern has been called *conscious computing* (Greenfield, 2008). The experience of conscious computing is the development and integration of healthy Internet and media technology use. This concept was first observed in the numerous German nonprofit organizations providing public education and prevention materials espousing healthy computing behaviors. A moderated pattern affords a greater degree of conscious self-control and balanced use, and it is this conscious use that afford greater self-control and balanced use.

The goal of treatment then becomes education and prevention to help reestablish (within reasonable limits) a more moderate use pattern. Conscious use and self-awareness is the critical process by which this change occurs. Such behavioral changes are not easily achieved, and further discussion of this process will be left to chapters dealing directly with treatment strategies.

NEUROCHEMICAL FACTORS

There is a great deal of research currently (Hollander, 2006) that discusses the impact of the elevation of dopamine and other neurotransmitters in the addictive cycle; there is more specific brain research emerging that demonstrates with functional magnetic resonance imaging (fMRI) scanning clear neurophysiologic changes from online addiction. New studies have found that the neural substrate of cue-induced game urge and craving in online addiction is similar to that of cue-induced craving in substance abuse (Chih-Hung et al., 2009). It now appears that the addiction may actually be to the elevated levels of dopamine itself in the brain, not simply to the substance or behavior. It is this elevation of dopamine that the heavy Internet user becomes habituated to (Arias-Carrión & Pöppel, 2007). In essence, the intoxicating charge people get from using the Internet or other digital media technologies helps ignite what we classify as addiction. Many pleasurable behaviors become addictive, and because the Internet and other digital media technologies produce significant experiences of pleasure under this theory, the use of these can produce or possess an addictive potential.

The issue of diagnosing an Internet addiction is much simpler when we note that alteration of mood and consciousness occurs when we use or abuse the Internet and other digital media technologies. This pleasurable mood change increases the likelihood of further use and abuse. The nexus of an addictive behavior cycle is that pleasurable actions are followed by intoxication (elevated dopamine). This dopamine elevation is then followed by an addictive pattern, which leads to negative life consequences (including shame and guilt); this consequence pattern then serves to increase the desire to alter mood and consciousness in order to achieve psychic numbing and self-medication, thus facilitating further use or abuse.

DIGITAL MEDIA ATTRACTIVENESS

The following is a compilation of factors that appear to be characteristic of the addictive potential of the Internet and other digital media technologies (Greenfield, 1999b). The five main factors that make digital media attractive are:

1. Content factors
2. Process and access/availability factors
3. Reinforcement/reward factors
4. Social factors
5. Gen-D factors

CONTENT FACTORS

There is a plethora of highly stimulating (addictive) content available on the Internet. Most of this content is not unique to the Internet. The most addictive aspects of the Internet today, in terms of the percentage of people requiring clinical treatment, are sexual content and video or computer gaming. The abuse of these two content areas is by no means new or limited to the Internet; however, when accessing such content using the Internet, a synergistic process occurs wherein the addictive potential of these content areas becomes significantly amplified. When content is consumed online and through other digital media technologies, it in essence becomes the psychoactive raw material for Internet addiction. We know that the Internet medium itself has addiction-enhancing properties and the content that is consumed on the Internet is typically fun and desirable. The most common contents consumed include music, information, sports, shopping, financial and other news, gambling, games, sexual content and so on. Many, if not most, of these content areas are inherently pleasurable; gaming, gambling, shopping, and sex are perhaps at the top, and have a history of being overused, abused, or addicted (Young, 1998a).

With the advent of Internet technology, the ability to easily and frequently access such content has enhanced its addictive potential considerably. If content is the raw material, then the *Internet medium* is the psychological syringe that delivers the content into our nervous system for consumption. There has never been a more efficient and direct input into our minds and nervous systems than the Internet. Now, with the advent and proliferation of high-speed connections and mobile Internet portals such as smart phones, PDAs, iPhones, BlackBerries, and many other portable devices, accessibility is even further enhanced.

Even iPods and other MP3 players are now Internet ready. The seamless ease of access to the Internet from anywhere places the user as part of the Internet network itself. People have literally become nodes on a vast impersonal network system, and this system is now mobile and portable. The mobility of

current Internet access is based on our desire to have convenience and to have a sense of freedom and choice; it is this desire that fosters the illusion that more access and opportunity equals a better/happier lifestyle—that more is better. But that is a paradox. The more choices we seem to have, the less healthy we seem to become. The more choices we have, the more stress we have (Weissberg, 1983). We have seen this same phenomenon with the availability of a variety of food product choices. More is simply not better.

The availability and variety of previously inaccessible, illegal, or hard-to-find content enhances the Internet's attractiveness considerably. Finding what you want, especially if it is hard to find, is very intoxicating. In addition, the absence of delay of gratification in the ability to access such hard-to-find and potent content makes the Internet that much more compelling. "God in a box" (Greenfield, 2007) is a term used in some discussions of Internet use. It seems an almost magical experience to have a thought, curiosity, or desire, and to simply click with near-instantaneous manifestation of thought to reality. It also captures the near-deified level of worship that the Internet and other digital technologies receive. The threshold one crosses is very narrow and easily traversed on the Internet, and on the other side of this threshold is the world's most stimulating content, and therein lies much of the Internet's power and potency.

Process and Access/Availability Factors

The ability to experience one's personal power (extended and amplified via the Internet) in experiencing a fantasy, or to act out a persona, is highly intoxicating. The experience of enacting a sexual fantasy with the relative *ease*, *disinhibition*, and *anonymity* that the Internet affords is quite powerful (Cooper, Delmonico, & Burg, 2000, Greenfield & Orzack, 2002). Multi-user games, which utilize the Internet to allow social and game interactivity, appear to be even more addictive as they utilize the Internet platform. The vast majority of Internet-based games add additional attractive elements of social interaction, real-time competition, challenge, accomplishment, social hierarchy, and stimulating content—along with a very sophisticated variable reward schedule. Gaming content itself can be quite stimulating and addictive, but when combined with the Internet modality the synergistic effect seems to produce a still stronger addictive experience.

The Internet operates with a high degree of unpredictability and novelty, and it is this unpredictability that facilitates the compelling nature of the Internet.

Much of our Internet use pattern operates on a subconscious level—well below awareness; it is this automated use that supports a significant degree of time distortion and dissociation (loss of the perception of ourselves) when on the Internet (Greenfield, 1999b; Suler, 2004; Toronto, 2009). Indeed, estimates as high as 80 percent of individuals who use the Internet lose track of time and space while online (Suler, 2004). Early studies found that 80 percent of Internet

addicts (43 percent of nonaddicts) reported feeling less inhibited when online (Greenfield, 1999b), and more current studies have found that 8.2 percent used the Internet as a way to escape problems or relieve negative moods (Aboujaoude et al., 2006). This disinhibition effect further supports the Internet as a psychoactive medium; this consciousness- and mood-altering effect seems to operate irrespective of content. The attractiveness of the Internet modality seems, in part, to be separate from the content that is being consumed. Individuals who might consume sexual content, participate in gaming, or do shopping might do so with a greater degree of disinhibition and impulsivity when utilizing the Internet modality, compared to other use modalities (Suler, 2004).

Greenfield (1999b) found three main factors that seem to account for a good deal of the Internet addiction variance. The first factor could be subsumed under the broad category of *access/availability* or *process* factors. Cooper (1998) discusses this factor under his rubric of the Triple A Engine, where *affordability* and *anonymity* are included as well.

Within the general construct of access and availability is the fact that the Internet is always open, and this is a highly compelling feature. We know that the brain seems to enjoy the ability to have what appears to be unfettered access without constraints of time or space. Additionally, the factors involved in the interactive nature of the Internet modality itself seem to increase its attractiveness. Our research also demonstrated the second factor of perceived anonymity (Greenfield, 2009). It is the perception of anonymity in the online communication process that seems to facilitate disinhibition (Cooper, Boies, Maheu, & Greenfield, 2000). This is particularly notable in the areas of sexual behavior, gambling, shopping, and gaming. Disinhibition is also a factor in e-mail, chat, instant messaging, and text communications as well. There appears to be less restriction of inhibition during lexagraphic communication compared with the verbal modality.

We know from cognitive science and neuropsychology that disinhibition can occur when the brain is neuropsychologically compromised—basically in an altered state of consciousness. It stands to reason that this, to a milder extent, is what occurs when communicating online. In essence, compulsive online use is functioning in an altered state of consciousness. Additionally, the ability to access hidden or subconscious aspects of one's personality or persona that are not normally accessible appears to have strong addiction-facilitating effects. Fantasy and role-play via the Internet are highly appealing and are especially noteworthy in gaming, sexual chatting (cybering), and in social networking situations. An additional area that falls under the access/availability category is the relative low cost of accessing Internet content areas (Cooper, 1998). Access is thus enhanced by the relative low cost of Internet access, thereby lowering the threshold to using and abusing the Internet. It is easier to abuse things that are cheaper.

No discussion of access and availability factors can be complete without the inclusion of the *convenience* factor. The Internet is available with nearly

seamless and unfettered access 24 hours, seven days a week. Ease of access and availability is growing with the widespread adoption of portable and mobile broadband access. Cell phones, PDAs, and portable game and MP3 devices, in addition to laptops and their newest cousin, the netbook, are all geared toward portable Internet applications.

The ability to instantly obtain anything and to gratify any intellectual, communicative, or consumer urge in a seemingly anonymous fashion makes the Internet almost irresistible for many people. This is especially true for sexual content and experiences. The threshold to cross over from impulse (desire) to action (what is viewed, downloaded, played, or purchased online) is greatly reduced when online. There in essence is no barrier to cross, since the time needed to pick and click online is so short. There is also much less accountability due to the perception (however inaccurate) of anonymity and privacy. The degree of resistance that one might ordinarily have to fulfill a fantasy or desire is absent or greatly reduced when online, and this can have the effect of distorting reality. For the Internet addict, reality distortion is often perceived as a desirable outcome, as it supports the fantasy experience through the Internet's virtual interface. Once addicted, individuals may tend to view their virtual reality as more valid than real-time living. This is especially true for Internet and computer gamers. This distortion supports an overall level of denial, which can hamper the addicts' ability to recognize any negative impact in their lives. This is intoxication in its purest form!

Psychological inertia is often experienced as pleasurable (thus further feeding the addictive cycle) in that it blocks us from addressing what might be viewed as self-defeating. The Internet changes all of this because there is almost no lag or threshold to cross and we experience the Internet as a form of instant gratification. The need for delay or to modulate our desires is often absent with the use of the Internet. In a sense, thought becomes reality, instantly, which is quite compelling.

The final access/availability construct is boundaries. There are no boundaries with online content. All other forms of media have a discrete beginning and end. There are almost always markers for the passage of time or limits to content in newspapers, magazines, television shows, books, or other forms of media. By contrast, you are never done with anything on the Internet. There are no time markers while online, which is often compared to being in a casino with high stimulation, variable rewards, and no time structure. There is always another link, web site, or reference to find; always another e-mail to open, image to view, or song to download. There is always more. This unending availability of content represents unfinished business to the brain and is highly compelling. There is a tendency to move toward completion of all tasks for the brain—to complete the gestalt called the Zeigarnik effect (Zeigarnik, 1967). This unconscious attention to unfinished or incomplete information (which the Internet is replete with) is yet another compelling feature of the Internet.

REINFORCEMENT/REWARD FACTORS

As previously noted, Internet technology operates on a variable ratio reinforcement schedule (VRRS). All aspects of information sought after and found on the Internet occur within this variable ratio reinforcement environment. The Internet operates with a high degree of unpredictability and novelty, and it is this unpredictability that facilitates the compelling nature of the Internet's attractiveness.

The reinforcement/reward factor seems to be the most significant element in contributing to the addictive nature of the Internet and other digital media technologies. The Internet functions on a variable ratio reinforcement schedule. Whether it's gaming, sexual content, e-mail, shopping, or general information surfing, they all support unpredictable and variable reward structures. The saliency and desirability of the targeted online content, as well as the time and frequency when that content might be obtained, all affect the addictive experience to the content. There appear to be numerous synergistic factors that occur when the VRRS is combined with mood-enhancing or stimulating content, further cementing the addictive cycle.

The Internet is in part addictive because of its psychoactive properties. Inherent to any reinforcement system are the secondary gains that occur from a habitual pleasure pattern such as Internet addiction and compulsive media use. The secondary gains are those aspects of indirect benefit that serve to further reinforce the addictive pattern (elevation of dopamine). These secondary benefits may present in the form of avoidance of anxiety-provoking social interaction or effortful school or work performance, or as psychosocial exits from family or primary relationships. They can also be expressed as increased social stature within a social network or online game community.

Many elements of the Internet that are most attractive to people operate on a variable ratio reinforcement schedule. Young (1998b) was one of the first to note similarities between gambling behavior and heavy Internet use. It stands to reason that pleasurable Internet experiences operate within an environment where intermittent degrees of reinforcement are the rule. Here a pleasurable charge is received with both an unpredictable frequency as well as an unpredictable saliency. We experience this pleasure in the form of clicking on and thus finding and receiving desired content, mastering a challenging game, searching for and finding desirable pornography, or unpredictably receiving a desired text, instant message, chat, or e-mail. The same is true for searching on Facebook, MySpace, Twitter, and so on. All these hits are unpredictable, intermittent, and of varying attractiveness (saliency). It is this combination of unpredictable content salience and the variable reward structure that makes the Internet so addictive (Greenfield, 2008).

Even basic Internet modalities such as e-mail operate on this very powerful reinforcement schedule (e.g., you never know if that e-mail is going to be from a desired source with good news, junk mail, or a bill to pay). We know from

behavioral science research (Ferster & Skinner, 1957) that the VRRS is highly resistant to extinction, and because the Internet frequently provides variable rewards, this extinction resistance further reinforces the addiction cycle. Each time we log on to the Internet to surf, play a game, check e-mail, send an instant message, chat, text on a cell phone, or search for anything, we are invoking this powerful reinforcement principle (Young, 2007).

Combining this reinforcement system with highly stimulating content found in gaming or pornography will likely yield an even greater positive charge and an even greater resistance to extinction, thus reinforcing an addictive cycle (Greenfield & Orzack, 2002; Young, 2007). It appears that synergistic interaction occurs (Cooper, Boies, Maheu, & Greenfield, 2000), wherein the power of both the content and the Internet process are thereby amplified. Greenfield (1999b) begins to describe two types of Internet addicts with regard to sex: primary and secondary. Primary type typically consists of a sexually compulsive pattern of behavior that predates the use of the Internet for achieving sexual satisfaction. Here the Internet serves to function as a means by which a more efficient and expeditious sexual arousal and satisfaction cycle can be achieved. This Internet-enabled pattern often creates an accelerated development of compulsive sexual behavior. Here we see the synergistic process whereby the stimulating content of sexual material is enhanced by the psychoactive nature of the Internet medium itself.

In the secondary type, there is often no prior history of compulsive sexual behavior, but the development of the compulsive pattern seems to initiate almost concurrently with the introduction of the Internet. It is as if a spontaneous arousal/compulsion cycle ignites, often born out of the seeds of curiosity, sexual desire, and ease of access/availability or anonymity. With secondary-type compulsives, there is usually no history of prior sexual addiction or compulsion; here the Internet appears to activate a disinhibited process and support the addictive cycle. In such cases, the Internet process seems to lower the threshold for certain individuals to develop a problem that they likely would not have developed without the Internet medium. This is the Internet's strength and weakness, in that the immediacy of gratification can affect one's ability to inhibit previously managed drives and desires.

Most computer and Internet game manufacturers, as well as the sex industry, understand these behavioral principles, and they understand their use within the development of a game or other stimulating media, such as pornography. Most of the issues that we find with Internet addiction involve the unconscious and compulsive use of this technology with little or no awareness of the passage of time (dissociation/time distortion) or the negative consequences of this distortion (Suler, 2004). It is known from clinical analysis that much of the deleterious effect of heavy Internet use seems to be from the dissociated use of the technology, and the imbalance this creates in our lives.

Social Factors

The Internet is both socially connecting and simultaneously socially isolating (Greenfield, 1999a-c; Kimkiewicz, 2007; Kraut & Kiesler, 2003; van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, 2008; Young, 2004). This statement speaks to one of the major attractions of the Internet. The Internet affords titrated social connection within a highly circumscribed social networking medium. In a sense, users can tailor their degree of social interaction in a way that maximizes comfort and mediates connection, while minimizing social anxiety and limiting necessary social contextual cues.

With heavy Internet users (especially in the high school and young adult population) the Internet affords an easy way to participate in a well-controlled social environment with less need for real-time social interaction (Ferris, 2001; Leung, 2007). The Internet narrows and simplifies the social-emotional intelligence cues needed to a more manageable interaction level. For most users it lessens and attenuates the level of attention, interaction, emotional risk, and intimate connection needed in the social relationship. It reduces interpersonal relating to a tolerated level. For individuals with learning disabilities, attention deficit disorders, pervasive developmental disorders, social anxiety, and phobias, the Internet becomes a safe, predictable, circumscribed environment. It holds our attention, provides endless novel stimulation, minimizes real-time social interaction, and provides unbounded reinforcements and social rewards. It is no wonder why patients have such difficulty in modifying something that is so much fun and so adaptive.

It is important to note here that there is room for healthy, balanced Internet and digital media use, including social networking, texting, instant messaging, e-mail, and the like. Peltoniemi (2009) in Finland uses the Internet, texting, and social networking to assist children and young adults in learning to moderate their use and abuse; his organization, ICT-Services for Media Addiction, Prevention and Treatment in Finland, utilizes the very technology it is trying to limit to reach its audience; Peltoniemi is doing this because this is the main communications medium for this digital generation, or *Gen-D* (Greenfield, 2009). These digital communications modalities have become the norm for most of our youth (Walsh, White, & Young, 2008), and if managed reasonably, they can become less harmful and remain a part of modern social interaction.

No technology has ever existed before that connects us socially while simultaneously disconnecting us. This is the first time in recorded history that the capacity to express and broadcast oneself is literally in the hands of anyone with access to the Internet. The ability to broadcast oneself (as evidenced by viral levels of blogging and YouTube-ing) is intoxicating and provides, for the first time, broadcast capacity to everyone on the planet. Everyone's 15 minutes of fame is expanded exponentially, and the largest adopters of this technology are the Gen-Ds. The ability to efficiently social network is supported by the popularity of social networking sites such as Facebook, MySpace, Twitter, Friendster, and other social networking/consumer integrations. All of these

sites support the social efficacy of the Internet and represent some of the Internet's greatest strengths in its ability to efficiently distill and enhance social interaction in an instant.

However, there are clear drawbacks to such efficiency. For one, doing all this social networking is both addictive and very time-consuming, and therefore unbalancing.

In addition, the type of social interaction accomplished virtually seems to be quite different from other types of real-time social interaction; and it may not provide the same positive and health-enhancing benefits that real-time social interaction does.

Additional social factors include the wide level of acceptability and availability of Internet technologies in our culture, and the prevalence of personal computers, laptops, notebooks, portable digital devices, and especially Internet-ready cell phones. These technologies are woven into the social fabric of anyone under 30 years of age, who treat such devices as we elders would a toaster—with a comfort and familiarity that is natural. Internet-ready devices such as cell phones and PDAs speak to the normalization of the popular culture of Internet technology. If one wishes to be part of the mainstream, one needs to be connected to the Internet. This sociotechnical peer pressure is not to be ignored. Many of our peers, coworkers, teachers, and superiors have expectations for people to maintain constant availability, and among our youth culture having a cell phone and Internet access is becoming standard issue.

A few short years ago it was becoming widely accepted that individuals would have access to their e-mail while at home and in the workplace. This expectation has recently expanded to include the portable and constant availability of e-mail and other data. It is now expected that individuals can and should access their e-mail remotely at any time and any place. All these expectations lead to, at minimum, an increase of psychophysiological stress and at worst contribute to the potential for Internet addiction.

As wireless technology continues to untether us from land-based/wired computers and Internet access, there will be further employer expectations and social pressures exerted upon us to stay connected all the time. Early research studies conducted found that social factors were a contributing factor in the development of Internet addiction disorder (Kraut et al., 1999). A key factor is the inherent human desire to socially connect. As social creatures, we are invariably drawn toward social interaction; the need to connect and communicate is hardwired into our biology. All forms of Internet and digital media communication are in part an electronic extension of this natural proclivity.

When it comes to sex and pornography, the Internet has become a virtual Petri dish for sexual expression and sexual excess (Cooper, Scherer, Boies, & Gordon, 1999; Greenfield, 2009). However, little is known of the long-term impact from digital versions of social connection compared to more direct real-time connection. It would be overly simplistic to say that all forms of

digital and Internet social interaction are insufficient and inferior. And most people do not become addicted to these technologies, though many abuse them. However, the increased availability, ease of access, and normalization of these technologies increases the potential for problems to occur.

The ability to e-mail or text a friend or family member or to instant message someone may not necessarily be problematic. These new communication technologies have, in a sense, replaced talking on the phone or hanging out at the mall or malt shop for previous generations. The discerning question seems to be how much is too much and how we define too much. Many individuals, including parents, teachers, and spouses, ask: How much *is* too much? The answer always has to do with the ultimate impact on the overall balance and quality of living. Individuals do not present themselves for treatment unless there is some deleterious consequence in one of the major spheres of their lives. Often, an initial negative consequence is a considerable breach or negative impact on one or more of their primary relationships, a decrease in work or school performance, or a negative legal consequence.

In Germany, there is an active public education and prevention movement offered through government and nonprofit social service agencies to advocate healthy computing. The German government has taken to include Internet and media addiction as part of its overall drug, alcohol, and addiction education/treatment program. In Spain, the authorities are introducing programs to treat and prevent Internet addiction and are organizing professional training conferences. The United States does not yet have this same level of public awareness and organized prevention programs. This is in part due to how Americans use and abuse the Internet; most of their use is in the privacy of their own homes and not in the public arena as it is in many other counties. There also is a different health care and prevention philosophy and value system in the United States. In many Asian countries, such as China, Korea, and Singapore, there are near-epidemic levels of Internet addiction behavior, and they are addressing the issue as a public health threat.

GEN-D FACTORS

There are a numerous factors that appear to contribute to the Internet's addictive experience, and many of these are contributed to by our social or family context. From a clinical perspective, most treatment cases that occur involve negative consequences in primary or family relationships. Within the family constellation there is often a reversal of the generational hierarchy. When it comes to Internet and digital technology, today's children and adolescents have been raised with this technology. They are *Generation-Digital*, or *Gen-D.* (Greenfield, 2009).They are highly familiar with the computer, the Internet, and most other digital devices, and they often have more comfort and confidence with this technology than their adult parents have. It is more typical for the parent to impart knowledge and experience downward toward the younger generation. Here we have just the opposite.

The Internet functions to our Gen-D children in a seamless and natural manner, and they often have a greater Internet and digital knowledge base than their parents. For the first time in modern history, the generational knowledge and power hierarchy has been reversed. This increased familiarity and comfort, along with high levels of use, creates a power imbalance in the family system, which has a significant impact on how the technology is handled in the home. Often, the parent will have little or no knowledge of what is going on or how it all works and not be aware of the level of activity or abuse. Parents often don't know what is normal or what is reasonable, and they don't want their children to be left behind the digital growth curve. This lack of knowledge and lack of technological power further contributes to possible abuse and addiction to these technologies.

In the cases of children, adolescents, and young adults, the clinician's role is to educate and empower parents, caregivers, school personnel, and employers on how these technologies work, and to educate them on Internet/video gaming, gambling, online sexuality, social networking; as well as on general issues of overusing or abusing the Internet and other digital media devices. Without such information it is difficult to regain the power balance within the family system and take appropriate control of the family's technology.

CONCLUSION

We live in changing times. Our world is becoming smaller and we should feel more connected to those around us, but at times the very digital media technologies that purport to connect us to others often have an alienating, isolating, and addicting effect.

These digital communication and entertainment technologies (Internet, e-mail, cell phones, PDAs, iPods, gaming devices) are fun and can be helpful in our lives, but they all have addictive and abusable properties that can alter our mood and consciousness, distract us, and provide an exit from living in the present. These devices have the capacity to numb us and time-shift, thereby moving our attention from the present to somewhere else.

There is ever-present availability and unending access to overloaded information and communication; there are no boundaries, and there is no place to hide and recharge our internal psychological batteries. Being able to track and be tracked through every movement one makes via text or tweet takes a lot of time, energy, and attention and still leaves us with what might be classified as a two-dimensional social interaction. The implication when users are online, texting, tweeting, or using any other digital-based communication format, is that they are not where they are, but rather somewhere else; that they are not in the present and that their attention and energy are divided. This has the uncanny effect of making one feel that the user is physically there but not really present.

The rationale of multitasking is not valid in that we find that multiple tasks indeed divide our attention as well. There is no increase in efficiency, as it simply takes longer to accomplish all the activities when we are multitasking. This partial attention everywhere is a bit unnerving and leaves interactions with the electronically tethered somewhat less than satisfying.

The idea of disconnecting in order to connect to others seems ludicrous, as real-time social interaction and connection cannot be digitized or time-shifted without some negative impact. With moderation, there is a place for cell phones, PDAs, and portable Internet access portals. We know the Internet and digital media devices alter mood and consciousness and are therefore powerful devices, and therefore should be respected and limited. Technology is useful, but is not without its impact on our health and well-being.

We are not designed to be in a constant state of nervous system arousal and with all our portable devices all operating on a variable ratio reinforcement pattern. We feel as if we cannot turn them off and we begin to feel we cannot live without them. The question really becomes: Can we live well with them? Living our lives in virtual environments through gaming or in virtual worlds like Second Life leaves many questions. How can we live a second life when we really aren't living our first life? It seems we are running away from something, perhaps from ourselves. We are trying to numb ourselves or deal with boredom, or we feel disconnected from ourselves and our lives. So we stay connected, but also disconnected, distracting ourselves in a seemingly endless fashion. We go to bed using our technology and begin our day with it as well. We wonder why we feel depressed and drained and need Prozac. We live our lives unconsciously, wired and wireless, and then we medicate ourselves with the same technology when we feel bad.

We know that many marriages and relationships have been significantly impacted by the use and abuse of the Internet and other digital media devices. In France it was recently reported that 50 percent of all divorces have some type of Internet or digital media issue associated with them, and it was ruled that text messages can be used as evidence in divorce proceedings. Often these technologies become digital distractions from the real-time work of connection, intimacy, and communication. Having the portability and accessibility can be practical, entertaining, and fun, but highly distracting.

The future will likely see Internet and digital media addiction increasing. As the technology continues to become faster, cheaper, and more portable, it is likely that abuse and addiction will continue to grow. We are only on the edge of the true portability and mobility that is to come; it will not be long before our cell phone or PDA will be small and wearable or implantable along with a link for all our financial transactions. No more card swiping, no more cell phone to carry, just a small chip wired into our sense organs. Sound like science fiction? What was science fiction 40 years ago is used every day today. The only limits are our desire and our imagination, but technology for technology's sake is foolish at best and dangerous at worst. History is replete

with examples of how our greatest technological breakthroughs became new problems.

Some foresight into the use of these technologies may help prevent these problems. The longer we fail to see the power that Internet technologies have in our lives, the more likely we will be unconscious as to the negative impact they can produce from their use and abuse. The ability for us to recognize the potential positive and negative impact is what will allow us to manage our use in a more positive and conscious manner. In the long run, we must learn to live our lives with conscious computing and to integrate all of our digital media technologies into a healthier balance. We can manage our Internet and digital media technology so it doesn't manage us.

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