Two weeks ago, I (MD) checked my phone three times when I thought I had heard a message notification but I really had not. Twice I thought I heard a ding while my phone was sitting on the kitchen counter, a few feet from where I stood, and once I thought I felt it vibrate while I was carrying it in my bag. Each time that I checked my phone but saw no notifications of a new call or message, I was somewhat perplexed. I have heard many tales of phantom vibration syndrome (PVS), and I have even studied it, but until then I had never really experienced it. As our recent work (Drouin, Kaiser, & Miller, 2012) has shown that the experience of phantom vibrations is related to cell phone dependency, I started to wonder what these phantom vibrations really meant. Was I addicted to my cell phone? I do sleep with it beside my bed; however, it is turned off. Most days it is near me (within a few feet), but sometimes I do not even know where it is until I have to leave the house. I try to return text messages immediately, but sometimes it takes days. Is this an addiction? Am I going to experience PVS all of the time?

I thought … I pondered … I wondered … for about 30 seconds. (Because we do live in a fast-paced society, and I do not have time to dwell.) Then, as most psychologists would probably do, I thought about my recent circumstances – a new phone with Internet and new mobile applications (e.g., WhatsApp) that had an array of different sounds for their notifications (novelty) and a sister backpacking in Panama with me as her only contact (stress). I rationalized that my experience of PVS was circumstantial – an ephemeral anomaly – that would be gone as quickly as it came. And I was correct: I have not experienced phantom vibrations since.

Although I have determined that I have neither mobile phone addiction nor (at present) any of its symptoms, there are many people worldwide who do. In this chapter, we will present recent statistics on mobile phone use and then discuss a variety of topics related to problematic mobile phone use.
The Mobile Phone Era

In 2009, a panel of eight judges from the Wharton School was asked to judge the top innovations in the past 30 years (Korkki, 2009) – mobile phones were considered the third most important innovation, behind the Internet and computers. Like the Internet and computers, mobile phones are now ubiquitous, and their use has skyrocketed in the last decade. According to a report by the International Telecommunication Union (ITU, 2013), mobile phone subscriptions rose from about 2 billion worldwide in 2005 to about 6.8 billion estimated worldwide in 2013. Considering the world’s population is about 7 billion people (United States Census Bureau, 2013), this means that if each subscription belonged to a single subscriber, about 96% of the world’s population would have a mobile phone. Therefore, we are approaching a 100% penetration rate for mobile phone use worldwide (ITU, 2013). Notably, the penetration rate has already surpassed this mark in developed countries, where penetration is currently 128% (ITU, 2013). Because of the already high penetration rate, mobile phone subscription growth over the last decade has been lower in developed countries than in developing countries; however, worldwide, the increase in subscriptions is still impressive: approximately 1.4 billion subscriptions have been added in the past three years alone (ITU, 2013).

These statistics are somewhat unsurprising if one considers the sophistication of modern mobile phones. Although the first cell phones were capable of voice calls only, that all changed about 20 years ago, when the first text message was sent. Since that time, text messaging has become a mainstay of the mobile communication movement, and its use continues to rise. According to recent statistics, there were 5.9 trillion text messages sent in 2011, and this number is expected to reach 9.4 trillion by 2016 (Clark-Dickson, 2012). However, cell phone technology has evolved considerably in the last decade, and cell phones have progressed beyond text message technology so that most, if not all, of a person’s communication can be conducted via a cell phone. People can now easily access email and connect to others on social networking sites via integrated applications on their small, mobile handsets. Moreover, smartphones can record high-quality videos, play favorite music, and download almost anything from the web (albeit often at a slower rate than a desktop computer). Thus, mobile phones are a sort of one-stop shop for mobile communication, and as the following research will show, many people are very devoted to their one-stop shops.

Problematic Mobile Phone Use

As mobile phone use gained popularity, researchers began to study the ways in which individuals used this technology to interact with others, and it quickly became obvious that people were becoming reliant on their mobile phones. Therefore, in the last decade, a growing body of research has centered on mobile phone dependency or problematic mobile phone use. Problematic mobile phone use can be defined as mobile phone use that causes problems in a user’s life (e.g., sleeping, financial, compulsive, or dependence problems). It is often considered a subcategory of a larger issue known as technology (or cyber) addiction, and it has become so prevalent that some have advocated for it to be included as a diagnostic category of addiction in the Diagnostic and Statistical Manual of Mental Disorders (e.g., Chóliz, 2010).
Mobile phone addiction shares some of the properties of other types of behavioral and cyber addiction (Billieux, 2012). For example, psychological traits such as self-esteem and impulsivity are shared risk factors for different types of cyber addiction (Billieux, 2012). Because of these shared traits, Billieux (2012) suggested that mobile phone addiction should be evaluated as a subtype of cyber addictions. However, there are also specific risk factors that do not necessarily transfer across the various types of cyber addiction (e.g., illusions of control or social competence). Consequently, Billieux (2012) suggested that researchers and clinicians should focus on the online activity that a person is addicted to rather than the technology or specific website/application. This is a very important distinction considering the sophistication of modern phones. Although one person might use their mobile phone often and primarily to make voice calls, another person might spend the majority of their phone time on social networking sites. Thus, as modern mobile technologies and even websites (e.g., Facebook) become even more multifunctional, researchers of mobile phone or cyber addiction must begin to focus on specific activities people are over-engaged in (e.g., voice calls or social networking) rather than which technology or website they are using (Griffiths, 2012).

One of the first studies to examine mobile phone addiction was conducted in Australia by Bianchi and Phillips (2005). Bianchi and Phillips (2005) created a scale to measure problematic phone use (Mobile Phone Problem Use Scale or MPPUS) and also examined the correlates of this behavior. In their study, younger participants who were extraverts and had high self-esteem were more likely to have higher scores on the MPPUS scale. Since this time, many other researchers have studied problematic phone use with different populations (e.g., youth, teens, and adults) across the world. A summary of these studies, including their measure of problematic mobile phone use and the characteristics associated with problematic phone use, are listed in Table 11.1.

As shown in Table 11.1, even across cultures there appears to be some consistency in the correlates of problematic mobile phone use. For example, there is some consistency across studies that women (Beranuy, Oberst, Carbonell, & Chamarro, 2009; Jenaro, Flores, Gómez-Vela, González-Gil, & Caballo, 2007; Takao, Takahashi, & Kitamura, 2009) and extraverts (e.g., Ezoe et al., 2009; Hong, Chiu, & Huang, 2012) are more likely to report problematic mobile phone use. However, there are also some inconsistencies across studies for characteristics such as depression (Billieux, Van der Linden, D’Acremont, Ceschi, & Zermatten, 2007; Güzeller & Coşguner, 2012; Ha, Chin, Park, Ryu, & Yu, 2008; Jenaro et al., 2007), loneliness (Güzeller & Coşguner, 2012; Takao et al., 2009), and self-esteem (Bianchi & Phillips, 2005; Ha et al., 2008; Hong et al., 2012), with some studies reporting positive relationships and some reporting null or negative relationships between these characteristics and problematic mobile phone use.

These disparate findings could be attributable to a number of socio-cultural, historical, or methodological factors. It is quite possible, for example, that the Turkish high school students in Güzeller and Coşguner’s (2012) study are different from the Japanese university students in Takao et al.’s (2009) study because of differences in the socio-cultural context of mobile phone use in Turkey versus Japan, or in high school versus university. These socio-cultural differences could have contributed to the finding that loneliness was related to problematic mobile phone use in Güzeller and Coşguner’s (2012) sample but not in Takao et al.’s (2009) sample. It is also
Table 11.1  Summary of known studies examining problematic mobile phone use.

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Measure of problematic mobile phone use</th>
<th>Correlates of problematic mobile phone use/dependency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beranuy et al. (2009)</td>
<td>365 Spanish university students ((M_{age}=21.37))</td>
<td>CERM – Cuestionario de Experiencias Relacionadas con el Móvil</td>
<td>Female gender, psychological distress, and some aspects of emotional intelligence</td>
</tr>
<tr>
<td>Bianchi &amp; Phillips (2005)</td>
<td>195 Australian adults (aged 18–35, (M_{age}=36.07)) recruited via various methods</td>
<td>The Mobile Phone Problem Use Scale (MPPUS)</td>
<td>Young age, extraversion, and high self-esteem</td>
</tr>
<tr>
<td>Billieux et al. (2007)</td>
<td>108 Swiss undergraduate women psychology students (aged 19 to 48, (M_{age}=24.17))</td>
<td>Single-item measure of perceived dependence on mobile phone</td>
<td>Urgency, lack of perseverance, impulsivity. Anxiety and depression were not predictors</td>
</tr>
<tr>
<td>Billieux et al. (2008)</td>
<td>339 Swiss participants from the community (aged 20–35, (M_{age}=25.80))</td>
<td>Problematic Mobile Phone Use Questionnaire (PMPUQ)</td>
<td>Urgency</td>
</tr>
<tr>
<td>Chung (2011)</td>
<td>188 high school girls (aged 16–19) in South Korea</td>
<td>Problematic Mobile Phone Use Questionnaire (PMPUQ; National Information Society Agency, 2006)</td>
<td>Interpersonal solidarity</td>
</tr>
<tr>
<td>Ehrenberg et al. (2008)</td>
<td>200 Australian university students ((M_{age}=19.06))</td>
<td>Three item measure of salience, loss of control, and withdrawal</td>
<td>Neuroticism</td>
</tr>
<tr>
<td>Ezoe et al. (2009)</td>
<td>132 Japanese women nursing students (aged 18–49, (M_{age}=24.5))</td>
<td>Mobile Phone Dependence Questionnaire (MPDQ; Toda et al., 2004)</td>
<td>Extraversion, neuroticism, and unhealthy personal health practices</td>
</tr>
<tr>
<td>Güzeller &amp; Coşguner (2012)</td>
<td>770 Turkish high school students ((M_{age}=16))</td>
<td>Problematic Mobile Phone Use Scale (PMPUS)</td>
<td>Depression and loneliness</td>
</tr>
<tr>
<td>Ha et al. (2008)</td>
<td>595 Korean technical school students ((M_{age}=15.9))</td>
<td>Excessive Cellular Phone Use Survey (EC-PUS)</td>
<td>Depression, anxiety, difficulty in emotional expression, low self-esteem, and Internet addiction</td>
</tr>
<tr>
<td>Hong et al. (2012)</td>
<td>269 Taiwanese women undergraduates</td>
<td>Mobile Phone Addiction Scale (MPAS); revised from Young’s (1998) Internet Addiction Scale</td>
<td>Extraversion, anxiety, low self-esteem, mobile phone usage behavior</td>
</tr>
</tbody>
</table>

(continued on pg. 196)
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Measure of problematic mobile phone use</th>
<th>Correlates of problematic mobile phone use/dependency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jenaro et al. (2007)</td>
<td>337 Spanish college students (aged 18 to 32, $M=21.6$)</td>
<td>Cell-Phone Over-Use Scale (COS)</td>
<td>Female gender, somatic complaints, insomnia, social dysfunction, anxiety, and depression. No significant relations with substance abuse, pathological gambling, or health behaviors (e.g., sleep and exercise)</td>
</tr>
<tr>
<td>Kwon et al. (2013)</td>
<td>197 South Koreans from two companies and two universities (aged 18 to 53 years, $M=26.06$)</td>
<td>Smartphone Addiction Scale</td>
<td>Lower education level, university students, higher self-reported smartphone addiction</td>
</tr>
<tr>
<td>Takao et al. (2009)</td>
<td>444 Japanese university students (aged 18 to 39, $M=20.77$)</td>
<td>MPPUS; Bianchi &amp; Phillips (2005)</td>
<td>Female gender, self-monitoring, and approval motivation. No significant relations with loneliness</td>
</tr>
<tr>
<td>Thomée et al. (2011)</td>
<td>4,156 Swedish young adults (aged 20–24)</td>
<td>Mobile phone use measure including frequency of calls and SMS messages</td>
<td>Stress, sleep disturbances, depression, and mental health outcomes one year later</td>
</tr>
<tr>
<td>Walsh et al. (2011)</td>
<td>292 Australian youth (aged 16 to 24, $M=20.22$)</td>
<td>Mobile Phone Involvement Questionnaire (MPIQ; Walsh et al., 2010)</td>
<td>Female gender, younger age, self-identity, and in-group norm. No significant relations with self-esteem and need to belong</td>
</tr>
<tr>
<td>Yen et al. (2009)</td>
<td>10,191 Taiwanese junior and senior high school students (aged 12–19, $M=14.6$)</td>
<td>Problematic Cellular Phone Use Questionnaire (PCPU-Q)</td>
<td>Functional impairments (e.g., poor academic performance and financial problems) and depression</td>
</tr>
</tbody>
</table>

*Note. Measures without references were developed by the author(s).*
possible that differences could have emerged because of the changes in mobile phone use that have occurred over the last five years. Perhaps, four or five years ago when mobile phone use was on the rise but not yet at 100% penetration rate, many people were using their phones excessively because of the relative novelty of the mobile phone; however, now that mobile phones have lost their novelty effect, perhaps they are used excessively primarily by those who are lonely. Alternatively, it could be that excessive mobile phone use is causing loneliness, but it took time for this effect to emerge. Either of these historical explanations, or even other alternative explanations, could have influenced the results of these studies. Finally, methodological differences between the two studies could have contributed to conflicting findings. Güzeller and Cosguner (2012) created a scale (PMPUS) with three constructs: negative effect, compulsion-persistence, and withdrawal-tolerance, whereas Takao et al. (2009) used the unidimensional MPPUS (Bianchi & Phillips, 2005). Additionally, there were differences in the way these researchers treated their data. While Takao et al. (2009) used regression analyses to determine whether loneliness made unique contributions to problematic mobile phone behavior, Güzeller and Cosguner (2012) used only zero-order correlations to evaluate the relationship between the PMPUS and loneliness. The correlation between loneliness and problematic mobile phone behavior was low in Güzeller and Cosguner’s (2012) study, and the authors acknowledged that significant findings may have emerged because of the very large sample size.

In sum, although there are some consistencies across studies in the correlates of problematic mobile phone use, there are also some disparate findings, which are likely attributable to a number of factors. As researchers continue to do work on this topic, they should be cognizant of the ways in which methodological incongruities can be minimized. Billieux (2012) addressed one of these incongruities by advocating for some consistency in scale use across studies. Billieux (2012) provided an overview of the validated measures that existed at the time, which included the basis for each measure (e.g., substance abuse literature or existing studies) as well as its functional properties (i.e., number of items and factors). According to Billieux (2012), the MPPUS (Bianchi & Phillips, 2005) has been used widely as a unidimensional scale; however, newer multidimensional scales that delineate different types of problematic phone use (e.g., PMPUQ; Billieux, Van der Linden, & Rochat, 2008) might be more appropriate considering the many functions of mobile phones (Griffiths, 2012). Moreover, as mobile phone technology changes so quickly, researchers should be aware of mobile phone innovations so that the scales they use reflect the mobile phone capabilities of the time. As an example, Kwon et al. (2013) developed the multidimensional Smartphone Addiction Scale (SAS), which addresses most of the newest capabilities of modern mobile technologies. However, the SAS includes items like “My fully charged battery does not last for one whole day” (p. 4), which may not be relevant as technology changes. Therefore, the development and validation of problematic mobile phone use scales should remain an active area of research in the coming years.

Mobile Phone Use: The Case of Text Messaging

Recent media headlines have suggested that text messaging is on the decline (e.g., Halper, 2013); however, the actual story is that the popularity of platforms for sending mobile phone messages has shifted slightly from traditional text messaging to
chat applications (e.g., WhatsApp) and comments on social networking sites (e.g., Facebook and Twitter). Text messaging still remains one of the most popular communication methods, especially among teens and young adults (e.g., Lenhart, 2012; Smith, 2012). Recent Pew reports showed that among those who text, 18- to 24-year-old Americans sent or received an average of 109.5 text messages per day (Smith, 2012), and teens (12–17) sent or received an average of 167 texts per day (Lenhart, 2012). In contrast, real-time voice communication is on the decline in these age groups. For example, in Lenhart’s (2012) sample of teens, the prevalence of daily voice calls with friends went down from 38% to 26% in two years (from 2009 to 2011).

Although a shift from voice to text communication may not seem problematic in itself – texters, after all, are engaged in the process of writing, which is arguably a good skill to hone – some have become concerned that these virtual technologies are inhibiting our ability to really connect with others (e.g., Gorry, 2009; Sigman, 2009; Turkle, 2011). Turkle (2011) has even suggested that adolescents’ development might be affected in a profound way, as they are both tethered to their communication technologies through constant contact with others and leveraging these technologies to keep emotional distance. As an example, a person need not ask another to go on a date face to face or even via a voice conversation any more; instead, dating is often done informally through a string of text and Facebook messages (Williams, 2013). Therefore, people no longer have to plan dates, nor do they have to work up the courage to propose formal dates (Williams, 2013). This relatively small change may affect the way we approach other planning activities in our lives and our confidence in initiating face-to-face or voice interactions. Moreover, it is just one example of the many ways in which modern technology, specifically text messaging or instant messaging technology, may be affecting human interaction and development.

Even if one accepts that these global effects are part of the evolution of humans, some of the more specific, proximal effects of text messaging have attracted media and empirical attention. A few years ago, a New York Times headline suggested that “Texting may be taking a toll” on the mental and even physical health (e.g., texting thumb) of American teens and young adults (Hafner, 2009). Psychologists and researchers suggested that text messaging was influencing development, and the need for constant communication was promoting anxiety and dependence (Hafner, 2009). Although no known studies have examined the causal relationships between text messaging and declines in mental and physical health, there are a number of studies that have examined the correlational relationships between these variables. For example, Igarashi, Motoyoshi, Takai, and Yoshida (2008) found that among Japanese high school students, text message dependency was positively related to neuroticism, which is associated with negative emotional states including moodiness and anxiety. Text message dependency was also positively related to extraversion in their sample (Igarashi et al., 2008). These findings are similar to what was found in Australian samples during the same time period; Butt and Phillips (2008) and Ehrenberg, Juckes, White, and Walsh (2008) found that text message use was related to neuroticism and extraversion. Additionally, in Butt and Phillips’ (2008) sample, text message use was also negatively related to conscientiousness. Meanwhile, in their more recent study of Japanese adults, Lu et al. (2011) found that text messaging dependency was positively related to depression; however, mobile phone addiction was negatively related to anxiety. Considered together, these studies suggest that text messaging dependency is
associated with a variety of psychological traits, some considered positive (e.g., extraversion) and some considered negative (e.g., neuroticism and depression).

Text messaging dependency has also been linked to auditory and tactile hallucinations in the form of *phantom vibration syndrome* (Drouin et al., 2012). Phantom vibrations are vibrations that a person feels or hears even when their phone is not really vibrating or ringing (Drouin et al., 2012). Laramie (2007) was the first to examine this phenomenon empirically. He found that “phantom ring” was common in his general population sample (approximately two-thirds had experienced it), and it was significantly related to impulsivity, mobile phone use, mobile phone problem use, and use of the mobile phone to modulate affect. Subsequently, Rothberg et al. (2010) examined phantom vibration among medical staff and found that a similar percentage (68%) had experienced phantom vibrations but few (7%) found the vibrations bothersome. Although the samples were different, Rothberg et al.’s (2010) findings were somewhat similar to our recent findings (Drouin et al., 2012). Most of the undergraduates in our sample (89%) had experienced phantom vibrations, but only a few (9%) found them bothersome or tried to stop them (14%). More importantly, we found that text message dependency, specifically the emotional reaction aspect of dependency as measured by Igarashi et al.’s (2008) text message dependency scale, was a predictor of the bothersomeness of phantom vibrations. Meanwhile, neuroticism, extraversion, and conscientiousness were all predictive of some aspect of text message dependency (Drouin et al., 2012). Overall, these studies show that those who are more dependent on their mobile phones and text messaging, and especially those who are sensitive in their reactions to their text messages, are more likely to experience auditory or tactile hallucinations associated with their mobile phones.

A recent study by Lin, Lin, Li, Huang, and Chen (2013) has also provided some evidence that phantom vibrations are related to stress. Lin et al. (2013) examined phantom vibration syndrome in samples of medical students and found that the percentage of students who experienced phantom vibrations or phantom ringing (differentiated in this study) varied from 50.0% to 95.9% (phantom vibrations) and 27.4% to 87.7% (phantom ringing) depending on which phase the students were in their internship process. The lowest prevalence rates for both phantom vibrations and phantom ringing were found during the two-week period after the internship ended and before the internship started, respectively. Meanwhile, the highest prevalence rate for phantom vibrations/ringing occurred at some time during the course of the internship. Interestingly, although anxiety and depression scores increased and then decreased in a similar pattern, there were no significant correlations between the experience of these phantom perceptions and anxiety or depression. Because they were independent of anxiety and depression, Lin et al. (2013) concluded that these hallucinations were likely aggravated by stress, which provides support for models of stress-induced psychosis.

As mobile phone and text messaging dependency have both been linked with stress and anxiety in both the media and empirical studies (Cheever, Rosen, Carrier, & Chavez, 2014), a goal of future research should be to further examine the relationships between these variables. If, as Lin et al. (2013) suggest, phantom vibrations/ringing are aggravated by stress, it is also possible that mobile phone and text messaging addictions are aggravated by stress. Consequently, interventions or treatments designed to combat these addictions might target circumstantial factors rather than enduring psychological traits.
New Directions: Recognition and Treatment of Problematic Mobile Phone Use

One interesting line of research examines individuals’ recognition and understanding of their own addictive mobile phone behaviors. More than six years ago, Australian youth in Walsh, White, and Young’s (2008) sample were already expressing concerns that they were addicted to their mobile phones. They cited compulsive checking behaviors as well as limiting their travel or activities so that they could be in constant contact with others. At about the same time period, almost half (48.9%) of the adolescents in Yen et al.’s (2009) Taiwanese sample indicated that they had experienced at least one symptom of problematic cell phone use in the last year, and 16.7% indicated that they had four or more symptoms. Prevalence of these symptoms, especially a reduction in time for social, academic, or recreational activities because of mobile phone use, was associated with functional impairments such as financial trouble, poor academic performance, and poor relationships with friends and family members (Yen et al., 2009). More recent studies in the United States (e.g., Smith, 2012) have found that a fair number of American mobile phone users (11%) worry that they spend too much time on their mobile device, and this number is higher among those with iPhones (15%) and young adults 18–24 (21%). A need for constant contact and compulsive checking behaviors are still prevalent in these samples: almost two-thirds of Americans age 18–34 sleep next to their cell phones so that they do not miss anything or wake up in the night to answer text messages, and more than three-fourths of them check for messages or missed calls even when they have not heard their phone ringing (Smith, 2012).

Addictive behaviors related to mobile phone use could be considered part of the broader construct of nomophobia. Nomophobia has been defined as the fear of being without mobile technology, such as phones or mobile computers, and if recent media reports and polls are accurate, it afflicts millions of people worldwide (e.g., Michael & Sheppard, 2013). Empirical research on nomophobia is just beginning to emerge. For example, Dixit et al. (2010) examined nomophobia among medical students in India and found that almost one in five (18.5%) were nomophobes. Meanwhile, King et al. (2013) conducted a case study and treatment protocol with a single man with nomophobia. In their study, King et al. (2013) developed a successful treatment protocol for the patient’s nomophobia, using medication and cognitive behavioral therapy to shift some of the man’s interactions from online to face to face.

Although these two seminal studies on nomophobia have added to our knowledge of the disorder, they did not use validated instruments or accepted clinical criteria for classifying nomophobes. Dixit et al. (2010) based their classifications on their survey of mobile phone dependence, which was adapted from a now-defunct website that described nomophobia. Meanwhile, because there was no existing Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 2000) entry for nomophobia, King et al. (2013) made their diagnosis based on the patient’s symptoms, referencing the definition provided by Wikipedia and media sources. Despite its growing popularity as a term to describe this aspect of mobile addiction (a Google search returned 137,000 results), no known validated measures or clinical criteria exist for the diagnosis of nomophobia. As media reports are suggesting that many people are experiencing nomophobia (e.g., Michael & Sheppard, 2013), it would be prudent for
researchers to develop a validated scale for this aspect of mobile addiction and conduct further empirical studies to substantiate these claims. Although an individual scale or diagnostic category for nomophobia would be ideal, it might also be useful to include nomophobia as a subscale of an existing problematic mobile phone use scale, especially considering the shared traits in mobile addiction (Billieux, 2012). Insofar as existing scales are concerned, Kwon et al.’s (2013) SAS subscale of withdrawal includes several items that may be considered symptoms of nomophobia, such as “Won’t be able to stand not having a smartphone” and “Feeling impatient and fretful when I am not holding my smartphone.” Therefore, it might be fruitful to revise or expand the construct of withdrawal in future mobile phone dependency scales so that it accommodates nomophobia.

Finally, one of the most significant contributions of King et al.’s (2013) study was the authors’ suggestion that nomophobia should be examined with relation to other, possible comorbid mental disorders. King et al. (2013) made this recommendation based on the fact that their patient also had a social phobia disorder, as classified by the DSM-IV (APA, 2000). This suggestion aligns well with the recent findings of Rosen, Whaling, Rab, Carrier, and Cheever (2013), who found that technology-related anxieties and attitudes were predictive of the clinical symptoms of several mental disorders including narcissistic, antisocial, paranoid, obsessive, and histrionic personality disorders. Moreover, even after these technology-related attitudes and anxieties were controlled for, online behaviors, especially Facebook behaviors, were predictive of mood and personality disorders (Rosen et al., 2013). That said, cell phone use was associated with decreased depressive symptoms in Rosen et al.’s (2013) sample, which suggests that these technology-related anxieties, attitudes, and behaviors may be associated with some types of mental illness and not others. Considered together, King et al. (2013) and Rosen et al. (2013) established that comorbidity exists between cyber addictions/dependency behaviors and certain types of mental disorders (i.e., anxiety and personality disorders). Future research should explore whether these cyber addictions are simply manifestations of other mental illnesses or causal agents in the development of other mental illnesses.

**New Directions: Mobile Phones as Mechanisms for Behavior Change**

Although most of this review has highlighted the ways in which mobile phone use is problematic, a promising line of research examines the ways in which mobile phones, specifically text messages, can be used for behavior change through health-related interventions. Text messages have been used to deliver information and interventions related to a variety of health concerns, including smoking, HIV, weight loss and nutrition, immunizations, pre- and postnatal health, and substance abuse (e.g., Irvine et al., 2012; Kerr et al., 2012; Siedner, Haberer, Bosco Bwana, Ware, & Bangsberg, 2012; Snuggs et al., 2012; Stockwell et al., 2012; Whittaker et al., 2012; Ybarra et al., 2013). As an example, Irvine et al. (2012) engaged a group of disadvantaged men in Scotland in an interactive alcohol intervention using text messages. The uptake of their intervention was good: of the 34 participants, 88% answered questions posed to them about their drinking, and at least one person responded to every general text message sent, even though those messages did not request a reply. Therefore, Irvine
et al. (2012) suggested that text messages could be a low-cost unobtrusive method to engage hard-to-reach populations in interventions and collect real-time data on these populations.

Due to the success of these programs, behavior change initiatives using text messages are constantly in development, and much recent research has focused on developing tailored interventions based on feedback from targeted groups (e.g., Muench, Weiss, Kuerbis, & Morgenstern, 2013; Owens et al., 2011; Wright, Fortune, Juzang, & Bull, 2011). For example, Owens et al. (2011) sought feedback from service users and clinicians on how to develop a successful text message intervention to decrease the repetition of self-harm, and Wright et al. (2011) gathered information from the target group themselves about how to effectively deliver HIV information to young Black men. Meanwhile, in a study focused on addiction, Muench et al. (2013) surveyed those who were in an outpatient substance abuse treatment program to determine whether they might be receptive to text message follow-up care and what types of content they felt might be most useful. Of those surveyed, 98% indicated they might be interested in using text messages during and after treatment, and most indicated that benefit-driven messages would be preferred over consequence-driven messages. A significant number would also want to use text messaging to alert a counselor (78%) or friend (96%) that they were at risk for relapse (Muench et al., 2013). The results from focus group studies have been largely encouraging, and most participants believe that text-messaging interventions could be used as behavior change mechanisms.

In sum, the addictive properties of phones might be harnessed in positive ways, to affect other health behaviors and addictions. This type of research is encouraging, as it shifts the focus from the negative aspects of cell phone dependency to the positive ones and provides a promising line of future research.

**Summary**

Overall, problematic mobile phone use appears to be widespread and (across many studies) associated with a variety of negative psychological characteristics, such as anxiety, depression, neuroticism, poor sleep, and stress. Recent studies have also suggested that problematic mobile phone behaviors may be comorbid with other mental disorders, such as anxiety, mood, and personality disorders (King et al., 2013; Rosen et al., 2013). Therefore, the media furor may not be entirely unfounded – nomophobia, mobile phone addiction, and text message addiction, whether they are considered independently or part of the same construct, are real problems within modern society. Moreover, people are becoming aware of their addictions, and in coming years, it is likely that many people will seek treatment for their addictions. Fortunately for these people, help appears to be abundant: a Google search for “mobile phone addiction treatment” returned more than 26 million hits.

Perhaps future research should explore more directly whether these addictions are just symptoms of more general mental disorders (e.g., anxiety or mood disorders) or whether they can even be considered addictions at all. In a series of studies, Atchley and Warden (2012) showed that information has short-lived value among college students, which makes immediate texts or calls appealing. However, they also showed that college students make intentional choices about how quickly they share
information, depending on social distance. Therefore, whether or not a person responds immediately to a text or phone call appears to be an intentional choice, not one driven purely by addiction.

The fact that people are making intentional choices about their mobile phone use also means that the positive aspect of mobile phone dependency may not be so positive: behavior change interventions via text messaging may have limited success. People have the choice to read and respond to messages on their phones, and they may be less inclined to do so when they receive messages from people with whom they share no social intimacy. That said, it is worthwhile to do what we can, while we can, to leverage existing technology to increase individuals’ access to information and interventions. With new, game-changing technologies on the horizon (e.g., Google Glass), it is likely that the problems associated with mobile phones (e.g., phantom vibrations and nomophobia) will be ephemeral anomalies for everyone – until the next set of addictive behaviors and symptoms emerges.

References


Mobile Phone Dependency


