



Bad vibrations? Cell phone dependency predicts phantom communication experiences



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ABSTRACT

Phantom cell phone experiences are instances when mobile cell phone users perceive ringing, vibrations, and/or visual stimuli indicating an incoming call or message, yet no call or message actually registers on the phone. As a human signal-detection issue, these experiences may be influenced by psychological factors. We hypothesize that phantom cell phone experiences are a symptom of psychological dependency on cell phone communications and the resulting hypersensitivity to stimuli in the same class as cell phone notification methods. We find support for this hypothesis with path model analyzing responses from a large undergraduate sample. Self-reported symptoms of cell phone dependency strongly predicted the frequency of phantom cell phone experiences and mediated the relationships between personality factors, age, and participant sex with the frequency of phantom cell phone experiences. Women, younger individuals, and those with lower conscientiousness and emotional stability (i.e. higher neuroticism) had higher symptoms of cell phone dependency.

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1. Introduction

This study examines how age, sex, personality factors, and symptoms of cell phone dependency relate to the frequency of phantom phone experiences. Phantom phone experiences are hypothesized to be a feature of cell phone dependency and thus would be most strongly predicted by other measures of this construct. The relationships of demographic and personality factors with phantom phone experiences would be partially or entirely mediated by other measures of cell phone dependency.

Mobile cell phone users have reported experiencing ringing and/or vibrations associated with incoming calls and messages, only to find that no call or message had actually registered (Parisi, 2013). These experiences have been called “phantom ringing,” “phantom vibrations,” “ringxiety,” “vibrantxiety,” and “FauxCellArm,” and various studies indicate that between 27% and 89% of cell phone users report these experiences (Deb, 2015). Although discussions of “phantom vibration syndrome” are common in the media, it is not an actual syndrome representing a recognized disease or disorder (Rothberg et al., 2010). Also, empirical work in

this area is scarce in contrast to the prolific media attention (Drouin, Kaiser, & Miller, 2012). As of October 2014, there were ten scientific studies worldwide that investigated these phenomena (Deb, 2015).

Phantom cell phone experiences can be considered hallucinations, as the mind perceives a sensation that does not have a physical basis (Rothberg et al., 2010). We believe this phenomenon can be understood as a human signal-detection issue, with potentially important influences from psychological attributes. Human factors, such as experiences, expectations, and physiological states, influence the threshold for signal-detection (Tanner & Swets, 1954). Thus phantom cell phone sensations are psychological phenomena that are likely influenced by individual differences in personality, condition, and context. For example, medical staff who were younger, more junior in status, carrying devices in breast pockets, and using vibrate mode more frequently were more likely to experience phantom vibrations with pagers and cell phones (Rothberg et al., 2010).

The five-factor model of personality (“Big Five”), including openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism/emotional stability, has considerable cross-cultural empirical support (McCrae & Terracciano, 2005). Personality traits such as extraversion, conscientiousness, and neuroticism/emotional stability may be related to phantom cell

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phone experiences (Parisi, 2013). Those higher in extraversion enjoy being around other people more than being alone, are attention-seeking, assertiveness, sociable, and enjoy being the center of attention. Extraverts have stronger desires to create and maintain social relationships, and the social support functions of the Internet appear to be a basis for Internet addiction (Young, 1998). Both extraversion and anxiety predict mobile phone addiction (Bianchi & Phillips, 2005; Hong, Chiu, & Huang, 2012). The larger social network and greater level of interactions with others associated with extraversion may lead to greater expectations for, as well as actual, social messaging through one's phone.

Those higher in conscientiousness tend to be organized and dependable, show self-discipline, are motivated for achievement, and prefer planned over spontaneous behavior. Lin, Chen, Li, and Lin (2013) found that novelty seeking, but not harm avoidance or reward dependence, predicted phantom vibration and ringing. As conscientiousness is related to self-monitoring, those higher in conscientiousness are better at self-monitoring and may experience phantom phone events less frequently (as they are not actually occurring). Recognizing that individuals higher in conscientiousness are less prone to addictive tendencies, including Internet addictions (Kuss & Griffiths, 2011; Wilson, Fornasier, & White, 2010), Drouin et al. (2012) found that those higher in conscientiousness were less likely to experience phantom vibrations.

Higher neuroticism is the tendency to experience unpleasant emotions easily, such as anger, anxiety, depression, and vulnerability. The inverse of neuroticism is emotional stability, with higher impulse control and lower reactivity. Those high in emotional stability have a stable and calm personality and are less excitable. Those high in neuroticism respond poorly to stressors and often interpret common situations as threatening. Extraversion and neuroticism predict the strength of emotional responses to text messages, extraversion predicts excessive phone use whereas neuroticism predicts use for relationship maintenance (Igarashi, Motoyoshi, Takai, & Yoshida, 2008). Those higher in neuroticism may experience phantom phone events more frequently than those higher in emotional stability, as they are more reactive, excitable, and more likely to misinterpret stimuli.

The associations between personality factors and experiences phantom phone events may be mediated by relationships with psychological dependency on cell phones. An addiction is a recognized pathological medical condition characterized by compulsive engagement in rewarding stimuli, despite adverse consequences (Malenka, Nestler, & Hyman, 2009). Addictive stimuli are reinforcing and intrinsically rewarding, that is they increase the likelihood that individuals will seek repeated experience and they are perceived as positive or desirable, respectively (Malenka et al., 2009).

An attempt by researchers to add Mobile Phone/Technology addiction to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) was unsuccessful (Deb, 2015). Thus, although compulsive or excessive cell phone use may appear to have addictive properties, it may be more accurately described in terms of psychological dependence than addiction. Psychological dependence involves withdrawal symptoms upon cessation of drug use or engagement in certain behaviors that develop through consistent and frequent exposure to a stimulus (Malenka et al., 2009). Although clinicians distinguish addiction and psychological dependence as respectively mediated by positive reinforcement (a rewarding stimulus) and negative reinforcement (removal of an adverse stimulus, such as negative affect), we consider both types of reinforcement to be related to psychological cell phone dependency.

Dependency on cell phone messaging may be based on a need

for interpersonal communication (Drouin et al., 2012). Those who used phones in the classroom and when eating, a possible sign of dependency, were more likely to have phantom experiences (Subba et al., 2013). Drouin et al. (2012) found that those who checked for text messages more often and were more anxious when they did not receive immediate replies were more bothered by phantom vibrations. The relationship between the amount of cell phone use and the likelihood of phantom experiences varies by study (Catchings, Bush, Copes, Schaefer, & Wixom, 2010). Mobile phone dependency does predict levels of mobile phone usage (Billieux, Linden, & Rochat, 2008, 2007; Hong et al., 2012), however it is important to distinguish between frequency of use and psychological aspects of phone use, such as dependency (Walsh, White, & Young, 2010). High usage levels of social technologies are not always predictive of addiction symptoms (Charlton & Danforth, 2007). Psychological interpretations of messaging, rather than the actual amount of messaging, may be the proximate cause of symptoms such as phantom experiences (Drouin et al., 2012).

1.1. Overview and hypotheses

Psychological dependency on cell phones, based on the reinforcing aspects of interpersonal communication they provide, may increase the likelihood of phantom cell phone communication experiences. The perception of incoming messages is a function of human signal-detection, and sensitization to rewarding stimuli is a documented feature of psychological addiction, including hypersensitivity to the entire class of stimuli related to the one that is rewarding (Olsen, 2011). Thus, sensations similar to the ringing, vibration, and visual displays of phones may be interpreted as messages. Those who are more psychologically dependent on cell phone communication may be more likely to interpret ambiguous sensations (whether sonic, tactile, or visual) as incoming calls and messages. Personality factors related to the likelihood of phantom cell phone experiences are likely mediated through their relationship to symptoms of cell phone dependency (See Fig. 1). The Mobile Phone Problem Use Scale (MPPUS; Bianchi & Phillips, 2005) contains several items on negative reinforcement (removal of an adverse stimulus, such as negative affect) and positive reinforcement (a rewarding stimulus) via cell phone use. Thus, this subset of items may be used to assess cell phone dependency.

2. Method

2.1. Participants

Participants were 766 undergraduate students (384 women and 382 men) recruited from the Psychology Subject Pool of a large public university in the Midwestern USA. Participants were unaware of the topic of the study before signing up for the study, which was listed by its alphanumeric IRB code. The average age of the participants was 19 years ($SD = 1$, range 16–28). Participants could identify with multiple ethnicities: 45% Western European,

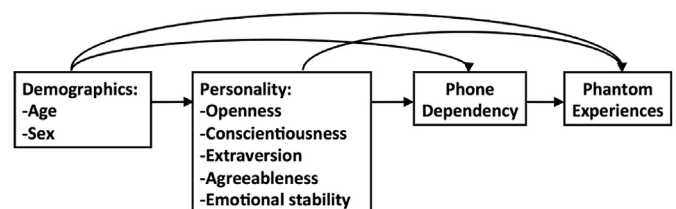


Fig. 1. Psychological process of phantom cell phone experiences.

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