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DOI

[10.4324/9781003312963-5](https://doi.org/10.4324/9781003312963-5)

Publication date

2024

Document Version

Final published version

Published in

The mobile media debate

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[Link to publication](#)

Citation for published version (APA):

Wolfers, L. N., & Karsay, K. (2024). The Smartphone as Physical Object: Advancing the Debate on Problematic Smartphone Use. In T. von Pape, & V. Karnowski (Eds.), *The mobile media debate: Challenging Viewpoints Across Epistemologies* (pp. 37-51). (Routledge Debates in Digital Media Studies). Routledge. <https://doi.org/10.4324/9781003312963-5>

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THE SMARTPHONE AS PHYSICAL OBJECT

Advancing The Debate on Problematic Smartphone Use

Lara N. Wolfers and Kathrin Karsay

The smartphone as physical object: Advancing the debate on problematic smartphone use

Smartphones have entered nearly all parts of modern everyday life. They are used throughout different parts of the day and contexts: no matter where we are, our smartphones are likely not far away. This almost all-embracing integration into everyday life has inspired metaphors comparing smartphones to multi-purpose digital Swiss army knives (Hobbis, 2020) or always-accessible first-aid kits (Schneider et al., 2023) but has also evoked fears about our overdependence on smartphones (Bragazzi & Del Puente, 2014; Kwon et al., 2013). Researchers and clinicians have stressed the importance of diagnosing clinically relevant dependence, such as nomophobia (the fear of having no access to a mobile phone, Bragazzi & Del Puente, 2014) or smartphone addiction (Kwon et al., 2013). But can we be addicted to a device? In the following, we will argue that it is not impossible, yet unlikely, for large parts of society. We will further argue that understanding smartphones as potential overdependence-evoking sources requires distinguishing them from other digital platforms and applications, such as social media and video games. We suggest that one such key distinguishing factor is the smartphone's physicality, manifesting in the opportunities for touch, sight, and boundary creation.

Claim: only very few smartphone users classify as pathological smartphone users

Intense smartphone use is widespread. A study, for example, showed that adult users unlock their device approximately 50 times per day (Nassen &

Karsay, 2023). Reasons for the intensive use of smartphones can be traced back to the particularities of smartphones. These include their nature as meta-media (Humphreys et al., 2018) which allow access to various applications and media offers. Moreover, smartphones are small and portable creating the phenomenon of being 'permanently online and permanently connected' (Vorderer et al., 2016), allowing users to be reachable anytime.

Concerns that this widespread use and the continuous reachability are detrimental to users' mental and physical health and general well-being are intensely discussed and also partially supported by various research findings. Availability pressure, for example, was shown to be associated with stress (Halfmann & Rieger, 2019) and smartphone use was shown to be related to negative consequences for offline interaction partners (e.g., phubbing, Wolfers et al., 2020). Based on these findings, we argue that the widespread use and negative consequences of constant smartphone access and availability are well supported by the literature. Accordingly, the question how we can reach digital well-being, defined as the optimization of the received benefits coupled with a reduction of negative consequences of mobile connectivity (Vanden Abeele, 2020), is one of the most discussed issues in current mobile communication literature.

How often does intensive smartphone use, however, reach the threshold of pathology and, thus, clinical relevance? Studies looking at prevalence partly report substantial numbers: in a meta-analysis on the prevalence of media addiction among medical students, Zhong et al. (2022) report, for example, an overall prevalence rate of 42%. We claim that these numbers are overblown and that there are only very few smartphone users whose use can actually be considered pathological. Pathological use is defined as a behavioral pattern that is characterized by the severity of persistent symptoms over time and the attribution that the behavioral pattern is at least an important cause of a psychological illness (Panova & Carbonell, 2018). We argue that the severity of symptoms and the attribution of the smartphone as the cause for these symptoms are both overestimated.

One of the reasons for this overestimation is the in-depth integration of smartphone use into daily routines. Smartphones have become indispensable tools in various aspects of everyday life, particularly in organizing one's daily activities. Thus, people rely on their accessibility for communication and navigation, similar to how they rely on the availability of power to provide light at night. Relying on something's functionalities comes with problems once the object is not available anymore. Being afraid of having no access to the phone is often discussed as a symptom of pathological smartphone use and called 'nomophobia' (e.g., Yildirim & Correia, 2015). However, whether relying on the functionality of an object is a clinically relevant symptom seems questionable, given it can hardly be avoided and applies to many other objects in our everyday life as well (e.g., car, purse, credit card). Similar arguments

can be made for other commonly discussed symptoms, such as getting gratification from smartphone use or getting distracted by using a phone (e.g., Kwon et al., 2013). Being gratified by something is a psychological process occurring in many other everyday life activities (e.g., hugging a loved one, eating something delicious). If such behavioral patterns are predominantly linked to the phone's integration into a digital lifestyle prevalent in today's society rather than truly indicative of problematic usage, it is neither beneficial nor suitable to employ them as symptoms for diagnosing pathological smartphone use.

A second reason for the overestimation of pathological use is the misattribution of the smartphone as the cause of psychological illness. Both researchers generally in favor of the study of pathological digital media use, and researchers who generally question the existence of digital media addictions, argue that addiction to the content that is used, such as mobile games or social media content, is much more likely than addiction to the device as the access point (Montag et al., 2021; Panova & Carbonell, 2018). Thus, what might look like problematic smartphone use in general could be attributed rather to the problematic use of specific content.

Moreover, digital media addiction, in general, could be a symptom of an underlying psychological illness rather than the cause of the psychological illness. Billieux et al. (2015), for example, describe a case study in which the problematic mobile phone use pattern of a patient was rather an outcome of a maladaptive general coping style focused on rumination than its own psychological illness. It is important to remember that links with potential smartphone consequences (e.g., a significant relationship with irregular eating, Kim & Kim, 2015) do not necessarily mean that smartphone addiction is causing these potential consequences. It is at least as likely that there is a third variable affecting both smartphone addiction and other outcomes of psychological problems. We argue that a general misattribution to smartphones as the cause is one of the main reasons for the overestimation of the prevalence of pathological smartphone use.

The smartphone's deep integration into our everyday life and the misattribution of smartphone use as the problem-causing behavior, we argue, account for an overrating of pathological smartphone use. Stating that the prevalence is widely overrated does not mean, however, that there are not very few people who could have developed pathological smartphone use. Therefore, we do not challenge the existence of the concept of pathological smartphone use. However, when it comes to thoroughly investigating pathological smartphone use, we should avoid attempting to diagnose smartphone addiction through self-diagnosis questionnaires that rely on items associated with the deep integration of smartphones into everyday life using samples of the general population. Instead, our focus should be on studying and providing assistance to the limited number of individuals who genuinely struggle with pathological smartphone use.

In the following, we will outline the ongoing debate surrounding pathological smartphone use, highlighting three key challenges: first, the similarity with previous discussions; second, the conceptual chaos within the field of problematic smartphone use, and finally, we will discuss the question of context-dependence concerning the identification of problematic behavior.

The debate about pathological smartphone use

Rediscovering existing debates

Several debates about problematic uses or addictions to digital media have prevailed in the academic and public discourse. Besides concerns about smartphone addiction, concerns about online gaming addiction, general Internet addiction, and social media addiction have been raised in public and academic discourses (Billieux, Schimmenti et al., 2015). What is to be noted, is that these discussions overlap significantly, and arguments from both sides – the ones arguing against pathologizing everyday digital media use and the ones stating that problematic digital media use is a widespread phenomenon – are similar across gaming, social media, or Internet addictions. For example, when looking at work that develops scales to diagnose smartphone addiction, there is an explicit attempt to identify similarities to other potential digital media addictions and to use similar items and dimensions (Harris et al., 2020; Kwon et al., 2013). Thereby, at least parts of the debate on pathological smartphone use are not focused on the particularities of smartphones but rather revisit past debates.

Conceptual chaos

Another characteristic of the debate around pathological smartphone use is the conceptual chaos which has also been referred to as the ‘wild west of measurement’ (Connolly et al., 2021). To describe the debate, we have distinguished the different constructs discussed in the literature into five categories: smartphone addiction, nomophobia, maladaptive smartphone use, smartphone attachment, and habitual smartphone use. We will describe each category and outline the key aspects and dimensions below while also focusing on what role the particularities of smartphones play in their conceptualization.

Smartphone addiction

Smartphone addiction involves ‘excessive, compulsive, uncontrolled use of one’s phone leading to a psychological dependence upon the device’ (James et al., 2023, p. 1). The most important feature of studying smartphone addiction is that the term implies a clinically relevant behavior that requires treatment

(Billieux, Maurage et al., 2015). Authors working on smartphone addiction study the construct from the perspective of addiction frameworks, building on the work on gambling as a behavioral addiction and associated theoretical models such as the I-PACE (Kwon et al., 2013; Montag et al., 2021). Symptoms mostly discussed are tolerance (ever-increasing use necessary to obtain need satisfaction), withdrawal (negative emotions and irritable behavior without access to a phone), uncontrolled use (using the smartphone automatically and longer than intended), and negative impact on daily life (e.g., being distracted from work, disturbances in relationships; Billieux, Maurage et al., 2015; Kwon et al., 2013).

Nomophobia

The second term used in the field with the claim of clinical relevance is nomophobia (Bragazzi & Del Puente, 2014; Yildirim & Correia, 2015). Nomophobia is a short form of ‘No-Mobile-Phone-Phobia’ and refers to pathological anxiety about having no access to a mobile phone (Yildirim & Correia, 2015). The terms smartphone addiction and nomophobia are not clearly distinguished in the literature (James et al., 2023), however, as a ‘phobia,’ the focus is more on the emotional experience of users, while the addiction term also emphasizes usage behaviors. Therefore, one might see nomophobia as a part of smartphone addiction, with addiction requiring additional symptoms (e.g., uncontrolled use, James et al., 2023). While conceptualizations of smartphone addiction resemble work on other digital addictions, nomophobia does not have a clear connection to other digital media phobias. Accordingly, the emphasis is more on the features of the phone, such as the need to have access to social support and information whenever needed (León-Mejía et al., 2021).

Maladaptive smartphone use

For behaviors that do not reach the level of clinical relevance but are still related to negative consequences for the individual, terms such as maladaptive, problematic, or compulsive smartphone use were proposed (Harris et al., 2020; Panova & Carbonell, 2018). As many studies do not work with clinical samples but rather assess smartphone use patterns in, for example, student samples, many studies that themselves use the term smartphone addiction can probably be counted as assessing maladaptive smartphone use (Harris et al., 2020). Although impairment due to maladaptive smartphone use patterns does not reach a clinical level, many users report that they experience their smartphone use as problematic themselves (Lopez-Fernandez et al., 2017). Maladaptive use can, therefore, be defined as usage patterns related to negative consequences for the individual without reaching clinical impairment.

Theoretical perspectives on maladaptive smartphone use resemble the smartphone addiction perspective in many articles (Elhai et al., 2017). Studies that explicitly argue against pathological naming usually focus more on the process of emergence and consequences of problematic use compared to symptoms of addiction (Billieux, Maurage et al., 2015). A clear distinction to other problematic digital media use forms is mostly not drawn.

Smartphone attachment

Smartphone attachment is another term used to describe users' relationship with their phones (Konok et al., 2016; Sohn et al., 2022). Other than in the previously described constructs, the framing around it is less negative. Building on attachment theory by Ainsworth and Bowlby (1991), the phone is conceptualized as an attachment object that is used as a compensatory replacement when primary attachment figures (e.g., family members or friends) are not available (Konok et al., 2017). While the used items resemble the ones in the nomophobia literature and focus on emotional aspects, the theoretical focus is less on negative consequences (Konok et al., 2017). A noticeable feature of this construct is that smartphones are conceptualized as attachment *objects*, so the haptic nature of the smartphone is the most pronounced.

Habitual smartphone use

The last construct category involves research studying smartphone use as a habit (Bayer & LaRose, 2018; Meier, 2022; Schnauber-Stockmann & Naab, 2019). Habits are 'automatically initiated behavioral response[s] stored as a mental representation' (Schnauber-Stockmann & Naab, 2019, p. 714). In the smartphone context, this can be summarized as automatically looking at the smartphone in response to certain cues. Research building on the habitual usage concept usually builds on the literature on habit formation and deficient self-regulation (Tokunaga, 2015) and emphasizes that habits can be both healthy and unhealthy (Meier, 2022). In this perspective, the context-independence of smartphone habits is emphasized as they can be used anywhere, anytime, which sets them apart from other media-specific habits, such as TV viewing habits (Bayer & LaRose, 2018).

Severity and prevalence: A comparison of the five categories

When looking at these five perspectives, we first note that the hypothesized consequences for users differ considerably. These consequences range from a list of negative consequences, including significant functional impairment in daily life in smartphone addiction research (Montag et al., 2021), to a combination of healthy and unhealthy consequences in the habitual smartphone use

context (Meier, 2022). Figure 3.1 shows an arrangement of the concepts according to the potential severity of negative consequences.

We expect that, given the severe impairment of the everyday life underlying an addiction diagnosis (Panova & Carbonell, 2018), actual smartphone addiction can be diagnosed only for a very small number of smartphone users. Nomophobia is similarly used for clinical diagnosis but is associated with less far-reaching consequences. It might have higher prevalence rates, however, if the concept is seen as a clinically relevant diagnosis, we still expect prevalence rates to be very low.

Interpreting the prevalence rates often reported for smartphone addiction as applying to maladaptive smartphone use, this behavioral pattern could be more common. Given how often we touch and use our devices (e.g., Wiese et al., 2013), some form of smartphone attachment can also be relevant for a larger number of users. Finally, on the right side of the spectrum, we expect that most smartphone users show some form of habitual smartphone use in response to certain stimuli and that, thus, a very high prevalence rate for habitual smartphone users can be expected.

All five concepts differ in how they problematize smartphone use. While smartphone addiction, maladaptive smartphone use, and the habit approach focus rather on behavior, nomophobia, and smartphone attachment concentrate on the emotional experience. Structuring the debate around pathological smartphone use this way emphasizes that there are several related constructs discussed, which, however, differ according to the prevalence rate, the severity of symptoms, and the focus on behavioral or emotional patterns. Sorting the literature in this way is however difficult as the construct categories presented are not distinguished clearly in the literature, and terms such as smartphone addiction are used for different severity levels.

The context-dependence of being problematic

Of note, although problematic smartphone use can be seen as an overarching term for all concepts, a definition of what ‘problematic’ means is rare. In

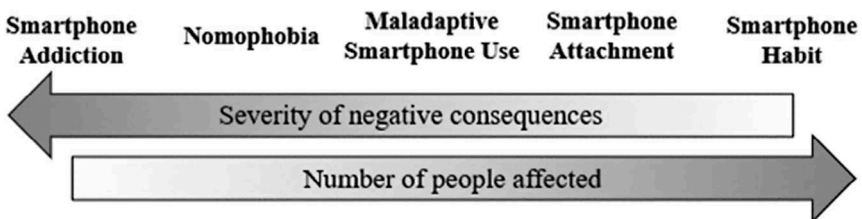


FIGURE 3.1 Concept arrangement of smartphone use concepts
Note: Reproduced from Wolfers & Karsay, 2023, CC-BY 4.0.

Problem Behavior Theory which was used for decades to understand behaviors such as drinking and risky sexual behaviors (Jessor, 2013), problematic behavior is defined as ‘behavior that departs from the norms—both social and legal—of the larger society (...) and that tends to elicit some form of social control response whether mild reproof, social rejection, or even incarceration’ (Jessor, 1987, p. 332). This definition illustrates that what is considered problematic strongly depends on normative societal judgments. Thus, what we identify as problematic is context-dependent, meaning it is likely to vary across culture and time. However, context-focused definitions are seldom used in research on problematic smartphone use. The acknowledgment of the normative nature and context-dependence of evaluations of what is considered ‘problematic’ is therefore often missing. Instead, definitions focus on ‘problematic’ as tied to negative consequences for the user (e.g., something can be seen as an addiction if it leads to a significant impairment of the user’s everyday life). The problem with such definitions is that research on its consequences can become tautological (Meier, 2022). If we define smartphone use behavior as problematic when it leads to negative consequences, then it should be no surprise that it is related to such negative consequences.

Overall, our summary of the debate around problematic smartphone use suggests that the conceptual chaos could be resolved if future work would establish a basic focus (emotional, behavioral) and decide on the severity of consequences or consider a specific sample to determine which concept is the most appropriate to use. In addition, a more explicit discussion of what is meant by problematic might help contextualize results. The most important step forward for the discussion around pathological or problematic smartphone use as a unique concept, however, is to focus more on what makes the smartphone different from other digital media. In the last part of the chapter, we propose that smartphones as physical objects are understudied in this field, and a focus on their physicality could help advance the debate.

To understand (problematic) use, focus on smartphones as physical objects

We argue that the primary and most understudied feature of the smartphone in this field is that it is a physical object. In addition to providing access to engaging (or even addicting) content anytime, anyplace, smartphones have a physical component. They can be touched, the smartphone can constantly be in sight, and smartphones can create physical communicative boundaries. We will outline these three aspects and report on how these three aspects might relate to problematic smartphone use.

Touch

The sense of touch is the earliest to develop in babies (Gallace & Spence, 2010). Touch plays a fundamental role in expressing, eliciting, and modulating one's feelings emphasizing how important touch as a sense is (Gallace & Spence, 2010). Being a touchable object sets the smartphone apart from other digital platforms, such as social media or online games. Smartphones are predominantly touch-operated and held, requiring physical interactions during use. Consequently, users interact with them frequently. Although systematic research on the frequency and intensity of physical interactions is missing, some studies claim that an average user has about 2,600 smartphone 'touches' (tapping, swiping, clicking; Winnick & Zolna, 2016), and others find that adult users unlock their device approximately 50 times per day (Nassen & Karsay, 2023). Besides active, intentional forms of physical interaction, passive, less conscious forms of touch exist. For example, during the daytime, the second most frequently reported placement of smartphones is in the trousers pocket (Wiese et al., 2013).

This high level of physical interaction with smartphones could affect their usage and how users perceive their devices. Studies have shown that touching objects leads to a higher perceived object ownership (the feeling that the product is 'mine') and a more positive evaluation of these objects (Peck & Shu, 2009). Built-in tactile feedback via vibrations is one example of how physical interaction influences the user experience (Kim et al., 2015). For example, with tactile feedback, the sensory impression of pressing a button can be provided although a 'flat' display is touched. The frequency of physical interaction users have with their phones could intensify (problematic) use and the relationship users have with their phones. Some users report vibrations from incoming calls or notifications, although they have not occurred, so-called phantom vibration syndrome (Rosenberger, 2015). This example highlights how smartphone use could become problematic due to the unique closeness created by touch and physical interactions with the devices.

Sight

As previously noted in our discussion of smartphone tactility, the smartphone is frequently kept within proximity or sight, as shown by several studies. A study by Dey et al. (2011), for example, where participants carried Bluetooth devices that tracked the distance to the mobile phone showed that in 50% of the situations, the smartphone was within arm's reach, while in 90% of situations the smartphone was in the same room as the participants. In a study where 600 participants were asked where their phone was right now, 'on the desk/table' was the most frequent response, with nearly 68% (Wiese et al., 2013).

How can the aspect of sight lead to increased attachment and dependence on smartphones? Research informed by technology habits suggests that seeing the smartphone might serve as a cue to check for notifications or engage in smartphone-related behaviors, potentially leading to distracted attention and problematic usage patterns (Bayer & LaRose, 2018). The observation that smartphones are often in sight has also inspired the so-called brain drain studies, which argued that having the smartphone in sight leads to it tying up attention and, thus, cognitive resources, which then cannot be used for other tasks. This is argued to reduce task performance (Parry, 2022; Thornton et al., 2014). While there is mixed support for these assumptions (Parry, 2022), the underlying assumption of the mere physical presence of the phone making a difference draws attention to the idea that having the phone in sight might impact psychological processes and problematic usage patterns.

Physical communication boundaries

A third aspect tied to the physical features of smartphones is that they can change the physical communication space of their users. Smartphones can create communicative boundaries which include the user and, in the case of co-use, the co-users but can also exclude non-users. If a smartphone is used in a social situation, it provides a physical signal to (potential) interaction partners representing a communicative boundary. A person using a smartphone is likely perceived as less ready for interaction with in-person communication partners than a person not using a phone. Accordingly, in a study about maternal smartphone use, mothers reported using their phones to signal to their children that while physically present, mothers were not available for interaction (Wolfers, 2021).

Researchers relating to the potential negative consequences of this boundary aspect have focused on phubbing. Phubbing is a portmanteau word, consisting of the words phone and snubbing, and refers to the phenomenon where users focus on their phone while being in a social interaction with others (Schneider & Hitzfeld, 2019). Phubbing is usually seen as a norm-deviant behavior related to negative feelings on the side of the interaction partner (i.e., phubee) and detrimental effects on the relationship (Roberts & David, 2016). However, it is important to note that the boundary-creating functions of a smartphone can also relate to positive or neutral effects, such as the possibility of providing a moment of relaxing solitude in a social situation (Wolfers, 2021) or not changing interaction quality when phones are co-used (Lutz & Knop, 2020).

While these three aspects related to a smartphone's physicality are not bound to negative consequences only, we argue that they are critical to consider when aiming to understand how problematic smartphone use is different from problematic uses of other digital media. However, these aspects are overlooked in the current debate. By emphasizing these aspects, we can

potentially prevent the reoccurrence of discussions that have already been held for other digital media, hindering progress.

Conclusions: Questions to discuss further

In the conclusion of this chapter, we want to formulate several questions which we think are, until now, insufficiently addressed in the current research landscape. Empirical evidence on these questions could strengthen our ongoing debate. We have argued that focusing on the physical nature of the phone, including the aspects of touch, sight, and physical boundaries, is important. However, how important each of these aspects is for problematic smartphone use is not completely clear as they have mostly not been empirically assessed yet, leaving several questions open for future research.

Question 1: How does touch change smartphone use, smartphone attachment, and smartphone use effects? The most understudied aspect is the smartphone as a touchable object. In other areas of study, touch was found to increase emotional connection (Gallace & Spence, 2010) as well as presence and embodiment (Gallace & Girondini, 2022). However, this idea was not transferred to smartphones yet. Unanswered research questions for touch include: (1) Does frequent touch of the phone (e.g., having it in the trouser pocket compared to in a bag) increase smartphone attachment? (2) Do users with more problematic use behaviors touch their smartphone more often? (3) How does touch change emotional experiences (e.g., anxiety, nomophobia), so for example, does touching the smartphone versus seeing it relate to the expectation that the smartphone offers comfort in stressful situations? These and similar questions can help answer whether the tactile factor of the smartphone changes usage of and emotional attachment to a phone or if, after all, problematic smartphone uses can be treated similarly to other forms of problematic digital media use.

Question 2: How does seeing a smartphone (more often) change smartphone use, smartphone attachment, and smartphone use effects? Research on the mere presence effect builds a first set of studies testing sight as a physical aspect of phones. As findings are inconclusive for these effects, however, future research is needed (Parry, 2022). Moreover, comparable to touch, studies testing the relationship between frequent exposure in terms of seeing the smartphone often and problematic smartphone uses can be insightful. Finally, distinguishing between the cognitive salience of phone content (e.g., thinking about phone content a lot, online vigilance; (Reinecke et al., 2018)) and the physical salience of a device (e.g., seeing the smartphone, Wolfers et al., 2023) provides interesting opportunities to further investigate the differences between content and device.

Question 3: How does the physical boundary feature of smartphones change smartphone use, smartphone attachment, and smartphone use effects?

Phubbing research has provided insights into how phone use can introduce communicative boundaries. Research into the positive effects of these boundary features are rare and could be particularly interesting for future research. Furthermore, again investigating differences between the physical boundary of the phone and from other devices, which could remove attention from social interactions (e.g., a TV behind one interaction partner which the other interaction partner is watching) would be insightful.

Question 4: Is problematic smartphone use the same across time and cultures? Finally, we want to call for more research and discussion on what we can consider problematic and what we cannot. Naming something problematic frequently includes a normative judgment, which can change considerably over time and between different cultures. Currently, scales around problematic smartphone use are translated without consideration of such differences. In addition to studying the physical features of phones to distinguish them from other digital media uses more clearly, assessment of the context-dependence of concepts and measures remains important for future research and discussions.

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