Toward "JOMO": The Joy of Missing Out and the Freedom of Disconnecting

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ABSTRACT

We took an ethnographic approach to explore the continuum between excessive smartphone use and healthy disconnection. We conducted a qualitative mixed-methods study in Switzerland and the United States to understand the nature of the problem, how it evolves, the workarounds that users employ to disconnect, and their experience of smartphone disconnection. We discussed two negative behavioral cycles: an internal experience of habit and excessive use, and an externally reinforced cycle of social obligation. We presented a taxonomy of non-use based on the dimensions of time and user level of control. We highlighted 3 potential areas for solutions around short-term voluntary disconnection and describe recommendations for how the mobile industry and app developers can address this issue.

Author Keywords

Smartphone; non-use; tech addiction; smartphone addiction; communication obligation; mindfulness

ACM Classification Keywords

H.1.2 User/Machine Systems (Software psychology, Human information processing), H.5 Information interfaces and presentation (HCI)

INTRODUCTION

As smartphones have become more useful and ingrained into everyday lives, there has been increasing media attention on the negative effects of excessive smartphone use [15, 34]. There is growing concern about smartphone distractions resulting in dangerous driving habits [31]; the National Highway Safety Administration (NHSA) reported 3,477 deaths due to distracted driving in 2015 alone [23]. Research has also linked smartphone distractions to the reduction of productivity [11, 30, 35], and there is evidence of negative impacts on social interactions [36] as well as mental health and wellbeing [6, 8, 28, 29]. Research on problematic smartphone use and its relationship to addictive behaviors has led to the development of several smartphone addiction assessments [4, 5, 14, 16].

As researchers working on the development of the Android operating system at Google, we have focused on understanding the concerns about smartphone use, to inform how to address them with our products. Our previous research discussed the difficulty that users face daily in managing their attention amidst the barrage of smartphone notifications [1]. Following that research, we anecdotally heard users tell stories of times they felt stressed when their phone ran out of battery, but soon after, they felt a sense of calm wash over them, as if they were "free". This led us to consider exploring the other end of the spectrum—the experience of disconnection from smartphones. We conducted this research study to explore the dynamics of excessive smartphone use and disconnection from smartphones.

RELATED WORK

Previous literature has detailed the benefits that smartphones enable, such as increased productivity, social connections, entertainment, and enhancing daily tasks in new ways [13, 18]. However, as the role of smartphones has increased, there has also been interest in understanding the misuse of mobile devices and its implications on the environment, society, and individuals. The increase in demand for mobile devices requires a significant amount of resources from mobile data and Wi-Fi infrastructures, causing concerns for environmental sustainability [18]. Lopez-Fernandez, et al. [17] found a 10% prevalence of problematic mobile users among their sample of British adolescents, using the Mobile Phone Problem Use Scale (MPPUS). Research has also found the use of smartphones to regulate unpleasant emotional states, such as distracting oneself from negative feelings or to increase stimulation and feelings of social connection when bored or lonely [20]; these attention- and emotion-regulation motives were found to be related to the practice of texting while driving [10].

With the abundance of daily interruptions driven by mobile technology, Wiberg and Whittaker [37] investigated how users learn to deal with interruptions and found that availability management demands cognitive effort to shift attention to the interruption and requires a negotiation process. Aranda et al. [1] observed participants being

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inundated with mobile notifications throughout their day, describing coping mechanisms they have adapted to filter out the distractions. Stothart et al. [30] found that interruptions come at the cost of performance on attention demanding tasks, even when the notification is not attended to, which they believe is due to the mind wandering that notifications can elicit.

Psychological factors have been explored as predictors of problematic mobile phone use. Using addiction literature, Bianchi et al. [4] developed the Mobile Phone Problem Use Scale (MPPUS) and found that age, low self-esteem, and extraversion predicted problem mobile phone use. Other predictors of problematic mobile phone use include gender, self-monitoring, and approval motivation [32]. Individual differences in mindfulness was associated with self-reported incidence of texting while driving [10].

Previous research on technology non-use has described motivations for limiting or refusal of technology and produced taxonomies of users. Magee et al. [20] found teens' self-regulation of technology use to be impacted by local policies and access, affective factors, life stage and future goals, and relationships. Baumer et al. [3] explored the motivations for Facebook non-use, citing data misuse, privacy, perception that Facebook is mundane, and disruptions in productivity. Satchell and Dourish [27] described six categories of non-use: lagging adoption, active resistance, disenchantment, disenfranchisement, displacement, and disinterest. A "preliminary taxonomy of non-use", characterized by four types of internet non-use: resisters, rejecters, excluded, and expelled has also been described [39].

The experience of technology resistance and its underlying motivations has also been investigated in the literature. Based on interviews with simple living families in the United States, Hakansson and Sengers [12] report motivations for living simply and its implications on their relationship with technology. Although these families rely on information and communication technology, they feel that with digital technology comes new expectations of participation (e.g., calls, texts, emails, sharing media, updating social networks, and being accessible). In a study of Orthodox Jewish families and their observance of the Sabbath, Woodruff et al. [38] described the value of technology and home automation in enabling a break from technology. For some, the break the Sabbath provides from technology allows for greater family bonding.

The goal of this study was to understand the experience of mobile phone overuse and non-use to inform opportunities for innovation in the mobile industry.

METHODOLOGY

Goals

Our goal was to understand the user experience of excessive smartphone use and the desire to disconnect, in order to make product recommendations to our business organization. We wanted to deeply understand the problem: how do users experience the difficulty in disconnection, what steps they take to address the problem, and what the ideal healthy phone relationship would entail.

Procedure

We conducted a qualitative, mixed-methods study, including in-home semi-structured interviews, full and half-day shadows to observe natural phone behavior throughout the day, and two-hour group discussions with participants. To encourage candor, participants in group sessions were familiar with each other (i.e., friends or family). All sessions were conducted in Zurich, Switzerland and in the San Francisco Bay Area in California, USA.

Participants

We recruited for a range of attitudes toward smartphone use, from people who described their current smartphone use as very healthy and satisfying, to people who were actively trying to reduce their smartphone use. To include a contrasting perspective, we also interviewed two local mindfulness professionals in the San Francisco area, to understand the problems they see in their clients, and the advice they give to coach them toward wellbeing.

The sample included 19 participants: 11 female and 8 male. Participant nationalities included Swiss, British, Bulgarian, Serbian, Austrian, Argentine, and American. Participant occupations included a teacher, student, writer, real estate agent, and small business owner. Their ages ranged between 18 and 65 and they used a variety of smartphone models, running either Android or iOS mobile operating systems.

Analysis

We analyzed our qualitative data from interviews and shadow observations via affinity diagrams and additional rounds of synthesis to produce high-level themes, insights, and process frameworks. We also retroactively analyzed qualitative data from previous ethnographic research we conducted between 2015 and 2016 (with 112 participants), pulling out information on users' reliance on smartphones, to inform our frameworks. Those studies were conducted in Japan, China, Singapore, and the United States, and followed a similar qualitative mixed-methods structure of interviews, observations, and group discussions.

RESULTS

Why Is It So Hard To Disconnect? Mobile Innovation Has Made Phones Indispensable

All participants stressed the utilitarian and critical nature of their smartphones, as a core reason why it's hard to disconnect. These essential functions bind people to their phones: communication, navigation, and transportation. Additionally, participants expressed that smartphones have replaced previously relied-upon objects like alarm clocks, cameras, pay phones, cash (in some countries), and

reference books, which make it even more essential in modern lives [18].

"If I have my phone, the world is my oyster. I can reach people, I can search anything. It's my comfort blanket, it's part of my natural existence."

Without a phone, participants experienced extreme inconvenience. It was harder to arrange in-person meetings with others, hard to communicate with others, on-the-go productivity was impossible (e.g., *"I couldn't check into my flight!"*), and they experienced boredom, especially on commutes [18, 26]. To participants, it would be a tough and very deliberate choice to deprive themselves of these essential functions.

New Expectations Of Time

The power and speed of smartphone technology has also evolved participants' expectations of how to spend time. They stressed the habit and expectation to maximize productivity anytime, anywhere (even while driving); a lull of just a few moments felt like boredom [18].

"Without my phone, what would I do— just stare out the window?!"

However, in contrast to the productive behaviors, participants felt very guilty when they spent time on unintentional behaviors. Even if they consciously decided to check social media accounts or watch a video, they later regretted it if they spent more time than they planned. They generalized this type of behavior as "scrolling"— mindlessly scrolling for more content, and getting into a rhythm that was hard to end.

"I spent 1.5 hours on [social networking site]. I was appalled at myself. I hate when I spend time just scrolling and scrolling… it's all mind-numbing, and I don't benefit from any of it."

New Expectations For Social Interactions

All users described the tension between sending and receiving messages. After sending a message, the sender experiences increasing anxiety while waiting for a response; a late response can feel like a snub or an indicator of your importance to the receiver. They described 3 categories of doubts: situational (are they busy right now?), personal (are they mad at me?), and safety (did something happen to them such that they cannot respond?). To address these doubts, there were some common workarounds: consider the receiver's typical response pattern to determine severity, check their other online accounts to see if there is recent activity, or contact a proxy (e.g., family member) for a status update.

On the receiving end of a message, receivers felt pressure to respond immediately or within a reasonable amount of time [37], typically between 20 minutes to the end of that day, to avoid breaking etiquette and offending the sender. But to meet this expectation often presents conflicts— distraction from what they were doing, taking attention away from the other people they were spending time with, or interrupting them from free time. A common workaround for the receiver was to not let the sender know that the message has been received, by only reading the first lines presented in the notification without opening it in an application or turning off read receipts.

Two Negative Behavior Cycles

We observed behavioral patterns similar to the habit model of trigger, action, variable reward [7, 9]. It starts with a trigger to check the phone, which can range from most intentional (a legitimate need to use the phone, like checking the time) to least intentional (notification sound or vibration), and others in between (boredom or "FOMO" i.e., fear of missing out, wondering if there is something that needs attention). The less intentional the action, the more regret the user expressed later.

In response to the trigger, the user engages with the phone, from reading the lockscreen info only, to unlocking the phone and going into apps to engage further. The rewards vary in value to the user, from new useful information (email, updates) to connections with others (messages, a social media 'like'), satisfying curiosity (I didn't have any new information), and unimportant information (unwanted notifications unworthy of distraction).

A participant described a smartphone as a "pocket slot machine"; at any moment, a reward could arrive, and the best rewards are most rare. This causes people to keep phones in close proximity and constantly check.

"If you could win the lottery at any moment, wouldn't you keep checking?"

Our data revealed two negative behavioral cycles, with distinct patterns of engagement: an internal struggle with habit and self-regulation, and an external obligation to fulfill social expectations of response.

Habit And Excessive Use

Participants expressed that over time, as they became more conditioned to the trigger-action-reward sequence, they started to feel "phantom" cues, or imagining that they might have received information, even if the phone hadn't actually notified them.

Or, some app or website experiences have engineered automatic triggers (e.g., infinite scroll, recommended content), which maintain user engagement. For both of these scenarios, users found themselves connected to their phones increasingly over time, more than they wished to. Participants also described other addictive patterns of engagement, from repeatedly refreshing an app, hoping for new content to appear, to even generating content to manufacture new triggers (e.g., posting on social media to receive responses) [17, 18].

"When I'm bored, I keep going into my news app and tapping the same article over and over, hoping for a new story to read."

"It's like a prison. You can get lost in your phone and not get out. Social media, gaming, being available [to others] all day… you can't get away."

However, there were some participants who reported lower smartphone usage and did not currently experience this habit cycle. One participant described her strategy for weaning off of a social media site, by gradually using it less and less over a 3-month period, until it was out of her daily routine, and by then, she was ready to uninstall the app. Similar to Baumer et al.'s [3] reports of methods that people create to limit their own use of social media, some of our participants described their self-imposed boundaries on when, where and how often they used their smartphone. This allowed them to have more work-life balance, spend more uninterrupted time with family, and generally feel more in control of their phone use.

Obligation To Respond

The other negative cycle we found involves social obligation toward others. Participants have become accustomed to instantaneous responses; they described a shared expectation of being available to others around the clock (especially if there are family members in a different time zone) and responsiveness. This shared expectation reinforces the behavior cycle and prevents people from disconnecting from their phone [19, 22].

"My phone is like a little pet- it goes with me from room to room. I don't want to miss any messages."

From FOMO To JOMO: The Experience Of Non-use

Even though participants wished to disconnect from their phone more often, those instances were relatively rare. Commonly cited examples include vacations, while out in nature, during meals with others, and when trying to focus (e.g., work, school).

There were 2 dimensions that impacted the experience of disconnection: level of control and duration of time (see Figure 1). This combination resulted in four conditions of disconnection, three of which we observed.

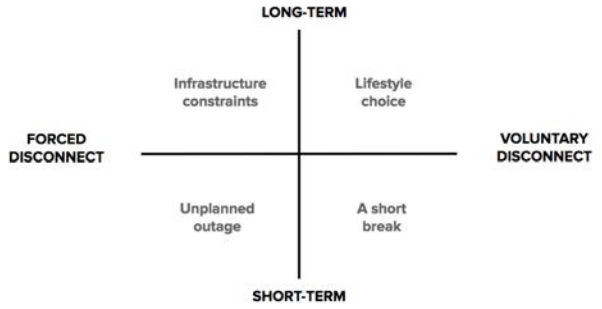

Figure 1. Four conditions of disconnection

Lifestyle Choice: Long-term Voluntary Disconnect

Some of our participants and specialists made conscious efforts to change their phone use. They drew boundaries for when they would not check their phones (often not even keeping it nearby) or be available to others, and felt more in control of their lives. Their friends, however, often expressed frustration toward their delayed and unpredictable response patterns. But the participants themselves were happy, felt less stressed, and over time learned to not feel guilty from friends' criticism.

Infrastructure Constraints: Long-term Forced Disconnect

We did not have any participants in this study who fit in this category. But in our team's other research in countries where connectivity is not consistently available or affordable, those participants accepted this as a part of life, and built workarounds to suit their needs. For example, one might turn on cellular data on an as-needed basis to avoid high costs. Since connection 24/7 wasn't the norm yet, it seems as if excessive use isn't a common concern. However, as connectivity is more readily available, users in those regions could begin to experience the stress that we saw in other markets.

Unplanned Outage: Short-term Forced Disconnect

When participants were faced with disconnection against their will, they reported experiencing anxiety and inconvenience. Common situations included a lost phone, phone inadvertently left at home, dead phone battery, and no access to cell connection or Wifi (e.g., airplanes, beaches). When this occurred, the top priority was to quickly find a workaround, such as someone else's phone or a computer to contact the most important people (e.g., spouse, close friend, or anyone who might be contacting them that day), or even going home to retrieve the phone. Many reported transferring their checking behavior onto another device, such as a computer to constantly refresh email and check for new responses.

If participants reached a point of acceptance and stopped looking for workarounds, they began to enjoy the break from their phone. They said they felt more "free", because they lacked the typical guilt associated with being unavailable to others, since the situation was out of their control. After successfully surviving a few of these instances, they learned that they could indeed survive without a smartphone for a day (though it's not their preferred state).

A Short Break: Short-term Voluntary Disconnect

A brief respite from phones allowed people to disconnect on their own terms, and even plan around it. Common cases included vacations, weekends, and during focus or work time.

"When I was on vacation in Greece, I left my phone in the room safe when I went out. It felt good to be away from my phone, while knowing it'll still be there if I really need it."

"On weekends, I try to be on my phone less. I also know that I'm going to get fewer emails and messages, so it's more okay to be disconnected on those days."

When questioned about the different scenarios of disconnection, most participants said they are more likely to follow through with disconnection when it's short-term and voluntary; it was their decision and they know they can change their mind if they wanted to, so it's less stress-inducing. The only negative aspect was the feeling of guilt for not being available to others; they may receive negative comments from others later if their message responses were too delayed.

DISCUSSION

Through this ethnographic mixed-methods approach, we explored the reasons why people find it difficult to disconnect from smartphones and what the experience is like when they do. These findings point toward opportunities where technology can help.

Consistent with previous research, our research described the challenges in self-regulating mobile use, due to internal and external factors. A smartphone's utility in enabling productivity, social connections, and entertainment, make it difficult to completely refrain from use [2, 18], without experiencing negative impact in other areas of life, such as professional necessity and family connections [13, 22, 26]. Momentary lulls in activity or the actions of mundane tasks can be experienced as 'dead' time, and the smartphone is used to fill those gaps [18]. The external factor of social obligation or communication reciprocity, also impacts the difficulty in reducing one's mobile usage [24, 37].

Previous research has created taxonomies of non-use, based on attitudes and degrees of participation [3, 27, 39]. In our data we found contextual factors influencing the experience of non-use: length of time (short to long term) and user level of control (voluntary to involuntary). This contextual basis was derived from users' descriptions of situations when non-use was forced upon them via events out of their immediate control (e.g., lack of battery or Wifi, lost or stolen phone). Also, one can cross categories in a relatively short time frame, as context shifts. These two dimensions combine to create four quadrants or conditions of disconnection.

From the four conditions of disconnection, we found that short-term disconnection was most conducive to success and may be the optimal approach for mobile product solutions. The other conditions have associated complications: a complete lifestyle change (long-term voluntary disconnect) requires disciplined habits in modern society where smartphone technology is relied upon, and may not be the preference for many people [13]. In low-connectivity areas, excessive use is not yet an issue. In short-term forced disconnect (ie unplanned outages), people reported feeling anxiety and initially spend effort to find workarounds. But with short-term voluntary disconnection, a user may be more likely to succeed because it was under expected conditions and within their control. People can continue to enjoy the benefits of modern smartphone technology, while maintaining moderate use habits.

The mobile industry has a unique opportunity to provide tools to help build healthy and satisfying mobile habits. Our research highlighted 3 opportunity areas: facilitate disconnection, reduce temptation to re-engage, and allow for partial disconnection.

Facilitate Disconnection

We can provide tools and strategies for smartphone users to disconnect along these phases: reflection, finding support, and practice. Reflection includes awareness of one's own online behaviors (e.g., usage metrics made visible to users), sending reminders to disconnect, and media outreach campaigns that increase general awareness of screen overuse and suggest solutions. Support includes tools that allow users to find support partners (e.g., communicate their goals to others for added accountability). Baumer et al. [3] found that respondents who knew someone who deactivated their Facebook account were three times more likely to deactivate their own account, thus highlighting the power of social influence. Through practice, users can form new habits; allowing user-defined boundaries for total usage time, certain apps, windows of time, or specific contacts could facilitate this practice.

Currently there are a multitude of apps that do one or all of the above. Some examples include Moment, Space, Thrive, Offtime, Forest, Flipd, AppDetox, and many more. The growing list of this category of apps suggests the trend toward increased focus on smartphone behavior modification, but more research is needed to assess which elements or features are most related to success. Additionally, there are capabilities that are innate to mobile operating systems, so the functionality is enforced at a higher level before the user even goes into the phone. Such areas of influence include volume or notifications settings, and lockscreen.

Reduce Temptation To Re-engage

Our participants stressed the importance of self-discipline when trying to disconnect, because there's no external forcing function preventing them from re-connecting; it's too easy to get re-engaged, from external or internal triggers. We have an opportunity to provide tools to help users get away and stay away.

A common request from participants was some form of obstacle that prevents them from re-engaging with the phone (e.g., a lockout for a short period of time), but also include a method to override it. Similar to a speed bump metaphor, it adds an extra step in an attempt to re-engage, and it allows the user to still feel in control. The mere presence of an obstacle could be enough to deter them altogether, or at least encourage a moment of pause to consider actions.

Allow For Partial Disconnection

The utilitarian nature of the smartphone in modern day lifestyles makes it difficult for users to disconnect from their phones, and can cause stress and frustration [13, 24]. A partial disconnection could be a more realistic compromise; the essential functionalities (e.g., phone dialer, navigation apps, camera, clock) can be available, but other applications can be restricted for a designated period of time. This could limit unimportant distractions, yet preserve the important functions that the user needs, thus encouraging more instances of disconnection from smartphones.

Other Directions

Reconsider Success Metrics

We feel that the technology industry's focus on engagement metrics is core to this attention crisis that users are facing. The more that businesses are incentivized to increase user engagement, as measured through frequency and duration of use, the more it feeds the competition for users' attention. Hakansson and Sengers [12] described user attention as a commodity sold to advertisers and stressed the importance of seeing the user as a non-consumer. Engagement metrics alone do not account for user satisfaction [2]; even when users enjoy an app, they can experience frustration and guilt from inability to cease engagement [26]. It's important to consider alternative metrics to indicate success, relating to user satisfaction and quality of time spent.

Efficacy Of Solutions

There is a need for additional research on mindfulness and its relationship to self-regulation of smartphone use. Feldman et al. found a link between low mindfulness and increased rates of texting while driving [10]. There is a wide range of mindfulness apps available today, but very few have high quality ratings (as rated on the MARS Mobile Application Rating Scale), and there is a lack of evidence of efficacy [21, 25].

Finally, in our 2018 Android operating system release, there are many features designed to address the user needs listed above. Future research on features like usage metrics, app usage restrictions, and notification controls can provide a deeper understanding of how these may influence smartphone use.

CONCLUSION

We conducted a qualitative study to understand the dynamics from smartphone dependency to non-use: how it happens, why it's so difficult to disconnect, and what workarounds users employ to regulate their usage. We discussed two negative behavioral cycles: an internal experience of habit and excessive use, and an externally reinforced cycle of social obligation. We presented a taxonomy of non-use based on the dimensions of time and user level of control. We highlighted 3 potential areas for solutions around short-term voluntary disconnection: 1) facilitating disconnection through awareness, support, and practice, 2) reducing triggers to re-engage, and 3) allowing for partial disconnection. We feel it's important for mobile operating systems and app developers to design responsibly with the users' attention, and wellbeing in mind.

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