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Digital Detox? A Mixed-Method Examination of Hedonic IT Abstinence Maintenance and its Effects on Productivity and Moderation of Use

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Abstract:

Excessive use of hedonic information technologies can cause various adverse consequences. To alleviate the consequences, some users abstain (take a break) from them. While previous studies examined the intentions to abstain, our knowledge of how abstinence is maintained is limited. This paper uses a mixed-method approach to examine this issue. Based on a review of prior literature, a framework is proposed, highlighting the role of individuals' motivations, habits, self-control, and the socio-environmental forces that influence the maintenance of hedonic IT abstinence. The framework is fine-tuned based on a qualitative study of individuals who took up to a week-long break from social networking sites (SNS) as a prominent case of hedonic IT. The refined model captures the roles of self-efficacy to abstain, IT habit, IT abstinence habit, and peer pressure on hedonic IT abstinence maintenance, which in turn explains positive changes in productivity and intention to moderate future use. The refined research model is tested via a quantitative study among a separate group of SNS users.

Keywords: Hedonic IT, Abstinence, Behavior Maintenance, Social Networking Site, Mixed Methodology, Productivity.

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1 Introduction

With the proliferation of hedonic technologies such as social networking sites (SNS), use time has soared over the last decade. Undoubtedly, these information technologies (IT) –used commonly for pleasure and entertainment (Vaghefi et al., 2023) - offer many benefits to users. However, excessive use of them can become problematic (James et al., 2017) and cause adverse outcomes such as diminished well-being (Stieger & Lewetz, 2018), lower performance, family-related conflicts (Venkatesh et al., 2019), and other psychological outcomes such as stress, anxiety, overload, and depression (Gan, 2024; Harness et al., 2022; Vogels & Gelles-Watnick, 2023). This is a prevalent problem, given that the use of these technologies has particularly gone up during the COVID19 pandemic (Dixon, 2024). Given these potential harms, many users choose to abstain from hedonic IT use in an attempt to mitigate these negative effects (Brailovskaia et al., 2022; Turel & Cavagnaro, 2019; Vaghefi & Turel, 2024).

It is important to study hedonic *IT abstinence* because, while prior IS research has largely focused on the permanent quitting of hedonic IT users (Soliman & Rinta-Kahila, 2020), intentional breaks have received relatively less attention (Soliman & Rinta-Kahila, 2020). Much of the existing literature centers around *discontinuance*, which refers to the permanent cessation of technologies like SNSs, where users do not intend to return (Turel, 2015, 2016). However, quitting permanently has proven particularly challenging for most users, as it requires significant self-regulatory efforts, especially in the face of habitual or compulsive behaviors (Turel & Vaghefi, 2020). Also, in practice, more than half of hedonic IT users reportedly take occasional breaks rather than quitting entirely. Given the benefits of hedonic IT, such as entertainment, communication, and connectivity, (occasionally) taking breaks presents a more practical approach for mitigating the adverse effects than permanent quitting. Recent evidence shows that abstinence can help remedy (at least some of) the negative consequences of use (Brailovskaia et al., 2022).

Although both discontinuance and abstinence aim to reduce or eliminate the harms of technology use, they involve distinct approaches (as described later). Discontinuance is considered a stringent measure driven by factors such as addiction, technostress, and cognitive dissonance, leading users to abandon technology permanently (Gan et al., 2023; Nawaz et al., 2018; Soliman & Rinta-Kahila, 2020; Turel, 2016). However, abstinence can be considered a more moderate approach, where users may intend to resume their use after a period of break (Turel & Vaghefi, 2020). While abstinence is not directly studied in IS, in other related domains (e.g., psychology), literature on behaviors such as vacationing (Schoenebeck, 2014; York & Turcotte, 2015) or digital detox (Radtke et al., 2021) has emerged. This research has revealed several underlying causes or correlates of abstinence, such as demographic variables (age, gender, or ethnicity) (Radtke et al., 2021). Further research also pointed out the role of urge, excessive use, perceived agency, or interventions such as cognitive-behavioral therapy on technology-related abstinence (Turel & Cavagnaro, 2019).

Overall, existing studies (whether on discontinuance of abstinence) have largely focused on users' *intentions*, often overlooking the complexity of sustaining behavior change (Soliman & Rinta-Kahila, 2020). These studies implicitly assume that once decided and initiated, the corrective behavior will be successfully maintained (Rothman et al., 2011). Nonetheless, while users may intend to quit, evidence suggests that many users quickly relapse into habitual use (Stieger & Lewetz, 2018; Tromholt, 2016), which leaves a gap in understanding how users can successfully maintain abstinence once it has begun. Psychology research has also shown that initiating change cannot guarantee behavior change (Kwasnicka et al., 2016). Furthermore, when not maintained, abstinence may impose adverse effects on an individual's self-efficacy and shrink future user self-regulatory efforts (Van Zundert et al., 2010). Understanding this issue can greatly inform users, technology providers, and policymakers, given earlier findings that support the positive outcome of abstinence on individuals' psychological well-being and professional/academic performance (Tromholt, 2016). Therefore, we posit that it is crucial to pay close attention to what underlies the maintenance of abstinence (vs. intention).

In this paper, we seek to fill the gap in understanding the maintenance of hedonic IT abstinence by answering the following research questions:

RQ1: What are the antecedents of hedonic IT abstinence maintenance?

RQ2: What are the outcomes of hedonic IT abstinence maintenance?

We first argue that factors relating to behavior maintenance are distinct from those relating to behavior initiation (i.e., intention-based research findings). Then, we review the major theories of behavior change to develop a framework that includes a set of broad families of factors. We further fine-tune the framework by identifying the specific constructs related to each family of factors through a qualitative study of 281 individuals who abstained from using SNSs for up to one week. The findings point to the specific factors (within the families) to be considered within the refined model. Last, we validate the proposed research model via a quantitative quasi-experimental study with 301 SNS users who were divided into abstinent (intervention) and normal use (control) groups.

Our study makes important contributions to IS research. First, it extends prior research that examined relevant behaviors, such as IS discontinuance, by examining why user behaviors are maintained beyond the intentions. Second, we extend our understanding of the key antecedents of hedonic IT abstinence maintenance by proposing and testing a research model that depicts its key antecedents. Third, we inform prior research on outcomes of user behavior by showing that hedonic IT abstinence maintenance improves productivity and increases intentions for moderated use. These findings carry important implications for users, technology providers, and policymakers.

2 Theoretical Foundation

2.1 IT Abstinence

The term *abstinence*, originating in the health and psychology disciplines, refers to the intentional act of temporarily refraining from a certain behavior for a period without relapse into habitual use (Hughes et al., 2003). In the context of IT use, abstinence typically follows a prolonged period of heavy or routine engagement, during which users have adopted the technology and progressively integrated it into their daily lives through continued use and appropriation (Gaskin & Lyytinen, 2012). For instance, a user may join Facebook in order to stay in touch with friends and occasionally post pictures, but over time s/he may start using the platform for far more reasons such as checking news, joining interest groups, staying up to date with events, and managing club activities s/he is part of. As the use progresses toward continued use, Facebook plays a central role in the user's life and becomes part of their daily routine, where one feels obliged to check it repeatedly throughout the day, sometimes to the point of excess. Due to this level of use, s/he may decide to take an intentional break from Facebook.

It is important to distinguish *hedonic IT abstinence maintenance* from *permanent discontinuation*, as the two behaviors are theoretically distinct. Discontinuation commonly refers to a permanent cessation of technology use, where a user decides to quit the IT system and does not plan to return. This process is often associated with challenges such as overload, addiction, exhaustion, or disenchantment with the system (Soliman & Rinta-Kahila, 2020; Gandhi & Kar, 2024). The goal of discontinuation is finality—a complete break with the technology and a permanent stopping of use, often without the intention of finding a substitute or returning to it in the future (Vaghefi et al., 2020). In contrast, IT abstinence maintenance refers to the ongoing process of temporarily refraining from using a technology with the possibility of resuming use later. Unlike discontinuation, abstinence maintenance is not about permanently quitting but involves a strategic withdrawal from (hedonic) IT use to achieve specific goals, such as reducing stress and addiction symptoms or avoiding distractions during work or school (Schoenebeck, 2014; Franks et al., 2023). The user may intend to return to the hedonic IT after the abstinence period, but during the break, they must actively resist habitual and craving triggers and manage the challenge of maintaining abstinence. This form of temporary cessation is often driven by the desire to regain control over usage, restore balance, or avoid dependency on IT (York & Turcotte, 2015).

Prior IS research has identified both types of behaviors (see Appendix A for a review). The first type includes a focus on the discontinuing of use that is associated with challenges such as overload, exhaustion, addiction, and technostress (Gan et al., 2023; Soliman & Rinta-Kahila, 2020). Another set of studies sought to understand discontinuing use with or without replacing it with another system (i.e., *disenchantment discontinuance*) (Maier, Laumer, Weinert, et al., 2015; Turel, 2015). Given the challenges of empirically studying discontinuance, as researchers may need to study users' behaviors for a very long time to ensure (permanent) discontinuance (Qahri-Saremi et al., 2025; Soliman & Rinta-Kahila, 2020), existing studies solely examined users' "intention to discontinue" and found key antecedents such as habit, information and social overload, fatigue, guilt, cognitive dissonance, and self-efficacy (Nawaz et al., 2018; Vaghefi et al., 2020; Zhang et al., 2016).

The second type includes taking a temporary break from use and behaviors such as vacationing or digital detox (Schoenebeck, 2014; York & Turcotte, 2015), which refers to intentionally withdrawing from system use but resuming it in the future. Unlike discontinuance, such behaviors refer to a temporal break from technology use (Franks et al., 2023; Jorge, 2019). In such situations, a user may resume use after the break, yet the nature and extent of use may differ (Cho, 2015; Franks et al., 2023). Early studies have shown the association of demographic variables (gender, race, and ethnicity) with taking a break from a SNS (Stieger & Lewetz, 2018; York & Turcotte, 2015). Factors found important in these studies range from external forces (e.g., being on a trip) to internal motivations, such as avoiding time waste during an exam period (Rosen et al., 2013). A recent systematic review study also provided a theoretical overview of a number of issues underlying discontinuance decisions, including the need to regulate social media to counter excessive use, restore agency, and minimize distractions that can promote such behaviors (Franks et al., 2023).

Despite the valuable contributions made by studies in both streams, this research has primarily focused on the *initiation of abstinence and not on the occurrence of the actual behavior*. In this way, the current understanding of how hedonic IT abstinence behaviors can be maintained is limited. This issue requires further investigation, especially since the factors contributing to one's intention to change could be distinct from those contributing to its maintenance.

2.2 Toward a Framework of Hedonic IT Abstinence Maintenance

To theorize about the factors related to the maintenance of hedonic IT abstinence, we reviewed literature in IS and reference disciplines (i.e., psychology and health), which revealed no dominant theory that can explain the maintenance of abstinence. Against this backdrop, we followed a mixed-method, deductive-inductive approach. First, we reviewed the major theories on behavioral change and its maintenance, based on which we developed a framework. We then conducted a qualitative study that pointed to salient antecedents and outcomes of hedonic IT abstinence maintenance (i.e., a research model). We validated this model in a quantitative study (Figure 1).

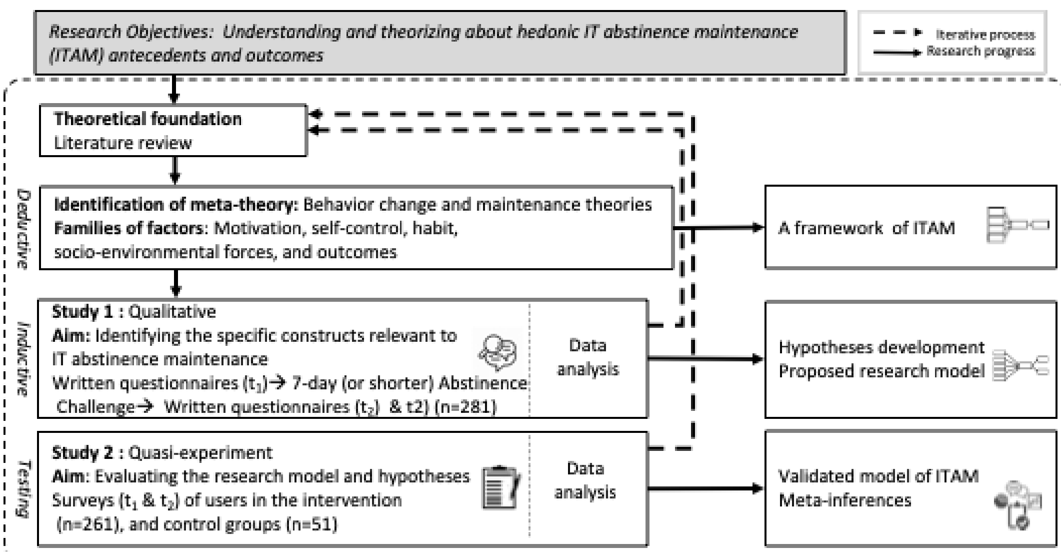

Figure 1. Research Procedure

The nature of abstinence implies a deliberate change in existing routines; hedonic IT abstinence thus serves as an intervention that disrupts established, habitual use patterns (Kim & Kankanhalli, 2009; Polites & Karahanna, 2012). The maintenance of IT abstinence as related to hedonic IT use thus involves exerting efforts to sustain change (break from use) over a period of time. In this way, the theories and factors that explain the maintenance of IT abstinence (RQ1 & 2) could involve those that explain the *sustainability or maintenance of behavior change* (Kwasnicka et al., 2016), which refers to sustaining a behavior change for a period after intervention was implemented and/or change has started (Fjeldsoe et al., 2011). We, therefore, conducted a review of sustainability or maintenance of behavior change in reference disciplines (i.e., psychology and health) (see Appendix B for details).

This review suggests that there is no unifying theory to explain the maintenance of abstinence; in fact, it appears that evidence of the effectiveness of a single theory in explaining behavior change is somewhat inconclusive (Gourlan et al., 2016). Nevertheless, considering a group of theories regarding behavior change and maintenance will be a suitable approach (Moody et al., 2018). Accordingly, we first reviewed major theories that have been used to explain behavior change and maintenance regarding behaviors such as maintaining a healthy diet and exercise habits and quitting smoking (e.g., self-determination theory and the dual process model). Guided by this review, we draw up a list of factors that potentially relate to hedonic IT abstinence maintenance. Since our focus was on the maintenance of behavior change instead of on the initiation of behavior change, we did not consider the factors that play a significant role only at the initiation stage (i.e., on intention). Finally, we mapped these concepts back to the group of identified theories and consulted prior research to see whether there is empirical support for the effect of these factors on maintenance success (Table B2 in Appendix B), which highlighted four families of factors (see Table 1).

Table 1. Review of the Theoretical Foundation

Family of Factors	Explanation	Reference Theories	
Motivation	• Motives based on attitudes and beliefs supporting change versus continuing the current behavior can affect maintenance success.	- SDT - SRT - SCT	- SLT - SMSC - HBM
Self-control	• Self-control regulates engagement with a new behavior • Self-control is needed to impede reverting to prior behavior. • One's ability and skills are important for behavior change maintenance.	- SDT - SRT - SCT - HT	- DPM - SMSC - TSRT
Habit	• Existing habits create difficulty in maintaining change and help in reverting to old behaviors/ • Habits create mental efficiency, which can be achieved regarding the newly adopted behavior (abstinence).	- HT	- TSRT
Socio-Environmental Forces	• Forces in the surrounding environment affect maintenance success. • People maintain behaviors that are in line with the values and norms they perceive from their environment.	- SCT - SLT - DPM	- SMSC - TSRT

Notes: **SDT**: Self-determination theory (Deci & Ryan 1985); **SRT**: Self-regulation theory (Kanfer & Gaelick 1991); **SCT**: Social cognitive theory (Bandura, 1982, 1991); **SLT**: Social learning theory (Akers, 1973); **HT**: Habit theory (Ouellette & Wood, 1998; Verplanken & Aarts, 1999; Verplanken & Orbell, 2003); **DPM**: Dual process model of behavior (Strack & Deutsch, 2004); **SMSC**: Strength model of self-control (Baumeister & Heatherton, 1996; Muraven & Baumeister, 2000); **TSRT**: Temporal self-regulation theory (Hall & Fong, 2007); **HBM**: Health belief model (Becker, 1974)

Motivation: Motivation has long been recognized as a key agent that prevents people from indulging in old behaviors and stimulates change and maintenance (Lawler III, 1973). Motivation is a predisposing attitude toward change or one's "degree of willingness to exert and maintain an effort" toward a specific goal (Franco et al., 2002, p. 1255). Motivational theory (Deci & Ryan, 1985) distinguishes between two types of motivations: intrinsic and extrinsic (Ryan & Deci, 2000). Intrinsic motivation refers to drives related to the inherent satisfactory outcome of that behavior, e.g., to have a fun, exciting, or challenging experience. In contrast, extrinsic motivation exists when an action occurs due to a separable outcome, such as a subsequent reward or punishment (Ryan & Deci, 2000). In the context of behavior change, it is argued that when a behavior is intrinsically motivated, individuals experience volition and will self-endorse a behavior, typically yielding more sustained behavior change compared to when extrinsic motivation is present (Deci & Ryan, 1985).

Self-Control: Self-control is needed anytime one exerts effort to inhibit the repetition of habitual behavior (in our case, resuming use) (Baumeister et al., 1994) and to replace it with purposeful behavior (Baumeister et al., 1998; Muraven & Baumeister, 2000). Prior research has shown that individuals typically initiate and maintain behavior change when motivation is high, yet it is the self-control that secures the unlearning of an established routine (Ouellette & Wood, 1998; Verplanken & Aarts, 1999) and decreases the risk of reverting back to the change (Rothman et al., 2011). In prior research, self-control is seen as a skill and a capacity to regulate a behavior successfully. It reflects individuals' planning skills or inhibition control, which helps overcome the effect of automatic responses (Nederkoorn et al., 2010). It is also considered an ongoing process of self-monitoring, self-judgment, and affective self-reaction. As per Bandura's (1991) social cognitive theory, individuals monitor their own behavior and compare it with a set of personal or societal standards (an observed difference may call for an adjustment of a behavior). A behavior that is sub-standard will result in a negative affect (such as guilt) and lead to efforts to change the current behavior or to the inability to maintain a new behavior (Kanfer & Gaelick-Buys, 1991).

Habit: Habit represents a behavioral tendency to provide responses automatically when stable conditions and cues in the environment are present (Verplanken & Aarts, 1999). When habit is strong, a behavior requires minimal mental attention or conscious effort (Limayem et al., 2007). Nonetheless, for habits to form, intentional, self-regulated behavior needs to be sufficiently repeated. The dual process model of behavior (Strack & Deutsch, 2004) posits that one's actions are affected by two brain systems: a reflective system that includes conscious deliberation and a reflexive system that is automatic and mainly without deliberation. Accordingly, a new behavior such as abstinence can be seen as a balancing act. If old habits, such as those related to prior use, are strong, carrying out the new intentional behavior, such as abstinence, will be more challenging. In addition, in order to maintain abstinence, it is important that it becomes automatic to the point where cognitive processing for abstinence (versus prior use) is no longer necessary (Verplanken & Aarts, 1999). Thus, old and new habits can potentially influence hedonic IT abstinence maintenance.

Socio-Environmental Forces: Prior findings on behavior change show that supportive socio-environmental forces can make it easier to maintain a newly adopted behavior; change is less likely to be initiated and maintained in environments that are not supportive of the change (Mackenbach et al., 2014). Prior IS research has also highlighted the role that social and contextual factors such as subjective norms, organizational support, or dynamics in the environment (Li & Ye, 1999; Sun, 2013) play in influencing users' behavior. According to social cognitive theory, many behaviors are learned by observing and then replicating what others are doing (Bandura, 1991). For instance, if individuals observe that people they know and trust tend to adopt a certain behavior (e.g., abstain from hedonic IT use), they will be more likely to behave in a similar way. In the same vein, social change theory posits a similar effect on individuals' behavior change when new trends (e.g., a new behavior) emerge in a community that one belongs to or identifies with (Nolan et al., 2008; Thompson & Kinne, 1990).

Outcomes of Hedonic IT Abstinence Maintenance: Prior research has mentioned notable positive outcomes of behavioral abstinence from potentially harming behaviors. For instance, it has been shown that abstinence maintenance can reduce behavior expectancy and the urge to continue problematic behaviors (Abrams et al., 1988) and improve one's ability and skills to cope with them (Condiotte & Lichtenstein, 1981). The limited recent research on hedonic IT abstinence has also shown that even a short break from use can improve life satisfaction and reduce negative mood and stress (Stieger & Lewetz, 2018; Tromholt, 2016). As abstinence outcomes are often context-dependent, their salience may differ based on the technology one tries to abstain from. Hence, we aim to identify context-relevant outcomes of hedonic IT abstinence maintenance and specific antecedents related to each family of factors in our framework via a mixed-method approach. Figure 2 summarizes our review of prior literature and illustrates the framework for understanding hedonic IT abstinence maintenance.

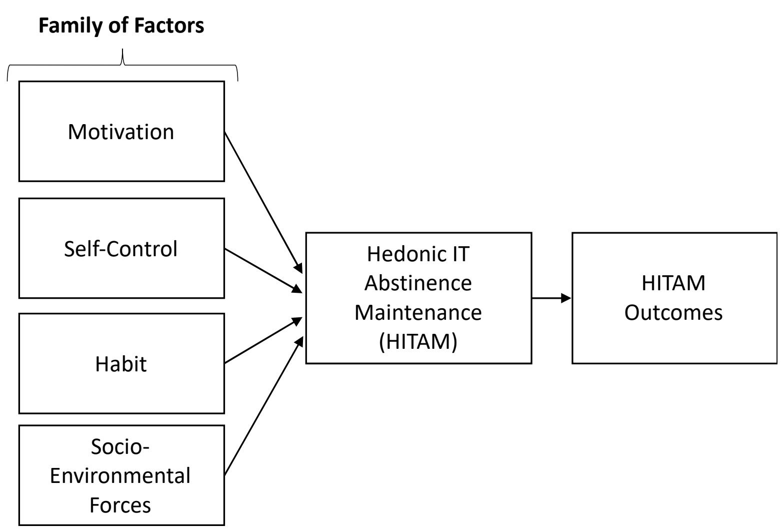

Figure 2. A Framework of Hedonic IT Abstinence Maintenance

3 Study 1: Qualitative Study of Hedonic IT Abstinence Maintenance

Given the lack of an overarching theory on hedonic IT abstinence maintenance, we conducted a qualitative study using the framework and the broad family of factors as our sensitizing tool. The aim of this study was to help us better understand abstinence maintenance, narrow our theorizing, and add contextual nuance to the family of factors identified as pertinent to hedonic IT abstinence maintenance.

3.1 Sample and Procedure

Data for this study were collected using written surveys (Lewis-Beck et al., 2004) from 281 undergraduate and graduate students (out of 354 invited to our research call, 79% response rate) at a large public U.S. university by focusing on participants' SNS use. We focused on university students (e.g., Gen Z), as prior studies identified them as among the highest users of SNS (due to available free time, high IT literacy, and high social connectivity), making them particularly relevant to the study of IT abstinence (Kil et al., 2021; Turel & Vaghefi, 2020).

The study comprised two questionnaires (collected at t_1 and t_2) and an abstinence exercise between them. The first questionnaire had open-ended questions about general SNS use, prior IT abstinence experience, and demographic information. Upon completing this questionnaire, participants were asked to take a break from the one SNS they use most frequently for a period of up to one week (called the challenge). Our choice of one-week abstinence was made based on prior research that has shown that individuals feel withdrawal, even when they do not use SNS for a short period of time (e.g., a few hours of a day). Recent findings show that individuals feel withdrawal, even when they do not use SNS for one day (Stieger & Lewetz, 2018); hence, taking a break for one week appeared to be long enough to expose individuals to the abstinence experience and study how they maintain it.

In the second questionnaire, participants were required to provide a narrative about their hedonic IT abstinence experience (Pentland, 1999), the specific issues that facilitated or challenged its maintenance, and what they achieved that resulted from the challenge (see Appendix C for the guide). Approval for the study was received from the Institutional Review Board (IRB) to ensure compliance with ethical guidelines before data collection. Also, we pre-tested the questionnaires with three IS researchers knowledgeable about the subject, as well as 22 individuals from the target sample. The questions were modified and re-worded to ensure clarity and consistency with the objectives of the study (Miles & Huberman, 1994).

3.2 Data Analysis

Qualitative data were recorded and analyzed using QSR's Nvivo following iterative rounds of coding (Strauss & Corbin, 1998; Urquhart et al., 2010). To ensure content validity, as described above, we first conducted a comprehensive review of the literature to define the broad set of constructs and developed an initial coding framework based on this review. Then, we engaged in a coding process including open, axial, and selective coding to stay sensitive to new insights without imposing our preconceptions while ensuring alignment with the framework (Paré, 2004). During open coding, the narratives were read line-by-line to gain familiarity with participants' reporting of hedonic IT abstinence experience (Patton, 2002) and assigned codes to concepts appearing relevant to hedonic IT abstinence maintenance. During axial coding, we organized the codes into broader categories and focused on relationships among them (see Table C2 in Appendix C). Our goal here was to maintain parsimony; hence, we focused on the salient concepts that were coded much more frequently than the others, ensuring that they reflected the key constructs. During this step, we received feedback from three IS scholars, who were subject matter experts on the validity and relevance of the codes, before the full analysis.

Selective coding allowed us to integrate and organize the core concepts (i.e., antecedents, hedonic IT abstinence behavior, outcomes) and establish a coherent chain of evidence using the most representative quotes (see Appendix D). During this process, we resolved any inconsistencies in the coding and interpretations through discussion among the authors. We continued the analysis until we reached the point of theoretical saturation (Fusch, 2015). Here, additional analysis revealed no new insight, further validating that the questionnaire, responses, and analysis comprehensively covered the key constructs related to abstinence maintenance.

To further ensure the reliability and validity of our analysis, an independent coder was asked to code 50 pages of the data. Cohen's Kappa was calculated at 0.783, indicating an acceptable inter-rater reliability

(Boudreau et al., 2001). Overall, the iterative process we followed in this study helped us establish the content validity and rigor of the qualitative analysis.

3.3 Results and Hypotheses Development

Descriptive results: Our results suggest that hedonic IT abstinence is a common phenomenon, with 65% of participants reporting prior consideration of hedonic IT abstinence and 51% reporting prior attempts. In addition, it appears that abstinence maintenance is particularly challenging, given that only 43% of participants maintained their abstinence for a whole week and that 72% of those who tried abstinence (M=3.8 days, SD=1.81) could not maintain it for the period they thought they could maintain. The findings confirm that not using SNS is challenging and requires significant self-regulatory effort. As one user put it: “I thought this [challenge] would be the easiest thing for me to do. And yet, not even 10 minutes later, I found myself trying to go back on Facebook.” They also support our contention that the initiation of abstinence (or intention to do so) does not always lead to successful maintenance of abstinence, as commonly assumed in prior IS research (Limayem et al., 2007).

Revisiting the Framework **and Model Development**: The analysis revealed the salient factors influencing hedonic IT abstinence maintenance in the SNS use context. Using our framework as a sensitizing tool, we mapped these salient antecedents onto the families of factors in our framework. These antecedents included *IT abstinence motivation, self-efficacy to abstain*, *IT habit, IT abstinence habit, and peer pressure*. This analysis also pointed to two salient outcomes of hedonic IT abstinence maintenance related to individuals’ perceptions about *productivity* and *moderation of future use*. In this section, we present these results (see the summary of evidence in Table 2) and reflect on the relevant IS and behavior change literature to revisit the framework, develop a research model, and formulate specific hypotheses about antecedents and outcomes of hedonic IT abstinence maintenance.

Table 2. Exemplary Evidence from Qualitative Analysis (See Appendix D for additional details)

Construct	Sample Qualitative Evidence	Sources
IT abstinence motivation	When I log into social media, I feel so released. I think I don't want to try to stop using social networks. I don't need social media in my life; I see it mostly as a distraction.	Adapted from Miller & Johnson (2008)
Self-efficacy to abstain	I knew that I would be able to control myself if I ever needed to, so it was nice and easy to have a detox period. I am sure if I wanted to stop using Instagram for any reason, I could, so the challenge made me test that, and it worked. [I] didn’t try hard to finish the challenge. I knew I wouldn’t be able to resist the urge to see what was going on in my network.	Adapted from Dzewaltowski et al. (1990)
IT habit	While I was on my phone, I would tap on the Instagram logo involuntarily and then was surprised I could not access the site. It was almost like it was ingrained in my muscle memory. I found it difficult and broke [abstinence] pretty quickly. It was mainly because, out of habit, I opened the app on my phone and signed in without even thinking about the fact that I was not supposed to be using it. More than anything, I feel like it has become a habit, so without intention, I sometimes naturally just open the app up.	Adapted from Limayem et al. (2007)
IT abstinence habit	The first three days were harder...but after that, I got used to it. After deactivating my social media account, I went back to the application frequently and had forgotten that I didn't have access to my account. After a couple of days, however, it became easier for me not to check my account, and I no longer had the desire to check it or think about it.	Adapted from Baumeister and Vonasch (2015)
Peer pressure	During the week, I kept getting messages from friends about why I deactivated my account. So, those who are conscious of it are definitely more likely to have a hard time abstaining from social media. After deactivating Facebook, I was very nervous about someone trying to contact me to ask me a question, but not finding me there, virtually. I basically caved right in.	Adapted from Santor et al. (2000)
Increase in productivity	Over the week, I also found that I was more productive because I was not spending as much time on social media. I usually check Facebook a few times per day, and for a lot of that time, I see the same information that I checked earlier. Throughout my week without Twitter, I felt slightly more productive as I wasn't	Adapted from Tsai et al. (2007)

	spending as much time scrolling through my newsfeed out of boredom. I felt that being away from that gave me more time to focus on studying because Facebook is a distraction while studying, especially when it can be mindlessly scrolled through. The lack of Facebook helped me have a clear mind and allowed me to focus on my schoolwork more. If the app was available to me, I would be going through the news feed instead of studying.	
Increase in moderation of use	Going through the week, I realized just how many times a day I mindlessly check social media when I'm bored. I am going to use the challenge to better control my Snapchat use. The exercise was eye-opening. I will try being in the moment and enjoying the present rather than spending much time online. After a little while of not having access to my account, I like to keep my social media use down to a minimum, and I am hoping that now, even with my reactivated Twitter, I'll be able to decrease my attachment to the app.	Adapted from Heather et al. (2010); Lozano et al. (2006)

First, many participants noted that their personal motives played a crucial role in initiating the challenge and then maintaining their abstinence. Examples of reasons include “to check if I can” or “sick and tired of wasting time on Facebook.” While encouraged to participate, there was evidence that many perceived ownership of their abstinence effort; as one participant puts it “*I knew that I needed to do something like this [abstinence], at some point so when the opportunity came, I got excited!.”* Irrespective of the reasons, our analysis showed that those who expressed such personal willingness also maintained the challenge longer and were able to overcome its difficulties (e.g., temptations to reinitiate SNS use).

IT abstinence motivation captures *the extent to which one is willing to remain abstained from hedonic IT use.* The effect of motivation on behavior maintenance can be explained using the self-determination theory (Deci & Ryan, 2008), which assumes that individuals, by nature, are self-motivated and eager to pursue a course of action that satisfies their objectives. The theory also recognizes basic needs such as competence and autonomy as drivers of inherent human actions (Ryan & Deci, 2000). Considering the various intrinsic reasons provided by participants, we can expect hedonic IT abstinence maintenance to provide an opportunity for users to satisfy their need for competence (i.e., they could stop their habitual use if they try) and autonomy (i.e., they can maintain a break from a habitual use). Hence, people with strong motivation to maintain their abstinence will be more successful than others in doing so. Therefore:

Hypothesis 1: IT abstinence motivation increases hedonic IT abstinence maintenance.

Another salient factor in our analysis was users’ perception of self-ability to remain abstained from SNS use. When asked at t_1, some participants expressed doubts about whether they would be able to stay away from the selected SNS for the whole week (or even a day). In contrast, some appeared confident in their ability to complete the challenge. The perceived ability to maintain abstinence (which we labeled *self-efficacy to abstain*) appeared to have implications for the application of self-control and maintenance of abstinence, as one respondent noted, “*I do spend a lot of my time checking its updates, but I knew If I wanted to stop using it for any reason, I would be able to. It wasn’t too difficult.”*

As an important element of self-regulation theory (Bandura, 1977), self-efficacy is defined as *one’s confidence in her or his ability to carry on actions to achieve an intended outcome*. Similar to our qualitative observation, prior studies have found that self-efficacy is a pivotal factor in initiating a behavior change (such as the use of a new system) (Agarwal & Karahanna, 2000; Compeau & Higgins, 1995), behavior maintenance, and controlling events that affect the new behavior (Bandura, 1991). When one is highly confident in her or his ability to abstain from use, doing so is deemed more plausible, and thus, more self-regulatory resources are devoted to it. In contrast, when a task seems unattainable, people give up more quickly. Indeed, self-efficacy to discontinue the use of SNS increases one’s intention to discontinue using SNS (Turel, 2015; Vaghefi & Qahri-Saremi, 2017). Extending this idea to the maintenance phase, we hypothesize that:

Hypothesis 2: Self-efficacy to abstain increases hedonic IT abstinence maintenance.

Our qualitative analysis highlighted the role of two habit-related antecedents, namely, IT habit and IT abstinence habit. *IT habit* can be defined as *the extent to which one acts upon previously learned automatic IT use* (Limayem et al., 2007).

Our analysis revealed that maintaining abstinence was frequently challenged by established habits that involved subconscious urges to check SNS. Many participants mentioned that SNS use is an automatic behavior, a result of previously learned use habits developed over time, indicating*“…what I did realize,* *though, was that while studying or doing work on my computer, I would keep logging onto Facebook out of habit every time."* In fact, prior IS research has shown that habits directly influence behavior, often leading individuals to act automatically without fully contemplating their actions (Limayem et al., 2007). Polites and Karahanna (2012) further highlighted that such habits can create inertia, making users resistant to adopting new behaviors, even when those behaviors are superior (less harmful) alternatives. Therefore, the strength of an individual's IT habit can directly impede their ability to break away from automatic patterns of use (Verplanken & Orbell, 2003), making it more difficult to maintain abstinence from SNS. This should make the maintenance of a new pattern of behavior difficult. Hence:

Hypothesis 3: IT habit reduces hedonic IT abstinence maintenance.

In contrast, as participants persist in the challenge, *IT abstinence habit* - defined as *a self-regulatory behavior pattern that develops through repeated abstinence from IT use* (Baumeister & Vonasch, 2015) — may help counterbalance the effect of prior IT habits. For example, several participants mentioned that the first few days of the challenge were much harder than the last few days. For instance, one mentioned that "I *had gone back to the application frequently …after a couple of days, however, it became easier for me to not check my account and no longer had the desire to check it nor think about it"*. This suggests that establishing abstinence habits facilitates abstinence maintenance. As shown in prior habit research, although a new behavior demands much cognitive processing, a state of efficiency will be established via behavior repetition (Verplanken et al., 1998), and thus, there is less need to exert self-regulatory resources to avoid "caving in" to old habits (Baumeister et al., 1998).

While people vary in terms of speed of habit development, prior IS findings have shown that user behavior must be repeated several times a day for one or two weeks (Polites & Karahanna, 2012) to become habitual (Limayem et al., 2007). For instance, one study showed that individuals develop, on average, 1.6 use habits (e.g., email or SNS use) after ten occurrences over 1-2 weeks of use (Oulasvirta et al., 2012). From this, it is reasonable to expect that hedonic IT abstinence maintained for several days or a week strengthens IT abstinence habit, which affords hedonic IT abstinence maintenance. Hence:

Hypothesis 4: IT abstinence habit increases hedonic IT abstinence maintenance.

Regarding socio-environmental forces, our qualitative analysis pointed to the salient effect of *peer pressure* (toward continuing use[1]) in the immediate environment surrounding the user. We found that this factor challenged participants and drove some to quit prior to the end of the week. Peer pressure can be defined as *the extent to which an individual is encouraged and expected to use IT by peers* (Przybylski et al., 2013). Several participants suggested that their experience in the challenge was influenced by pressure coming from their immediate network of family and friends who used SNS to communicate with the participants. Our observation was that when peer pressure is high, users may break their abstinence and go back to using hedonic IT in the way their peers use it. This issue was pointed out directly by several participants. e.g., *"My friends or family kept saying that they tagged me in something, and I need to see it"* or *"From the time I logged off Facebook, I got pressure from friends to keep up with the current social media trends".*

Prior research has shown that peer pressure, coming from a group with which individuals identify, strongly correlates with risky behavior and even misconduct (Robinson & Berridge, 1993; Santor et al., 2000). In the context of SNS, maintaining group membership often requires conformity to the norms of frequent engagement, which aligns with prior findings associating peer pressure with increased use of social technologies (Przybylski et al., 2013). Although positive peer pressure could theoretically support abstinence, our findings suggest that negative peer pressure is more influential in this context, as it conflicts with efforts to abstain from IT use.

Hypothesis 5: Peer pressure reduces hedonic IT abstinence maintenance.

Regarding the outcomes of abstinence, qualitative analysis hinted that maintaining hedonic IT abstinence can improve productivity during the abstinence period. Study 1 participants reported accomplishing more in their professional or academic obligation throughout their abstinence, a result likely attributable to both time saving and a reduction in distractions caused by hedonic IT, providing statements such as "*I was able to concentrate on my studies without any distractions or temptations. It was absolutely valuable*

[1] Please note that peer pressure could work positively toward the maintenance of abstinence when others encourage users to keep away from IT; however, based on our qualitative analysis, we only focus on the negative aspects of peer pressure, which could foster relapse.

because it allowed me to prepare for a test!". In our sample, IT abstinence saved an average of 3 hours 34 min per day from participants. Recent global surveys indicate that social media users now spend over two and a half hours per day on these platforms (Nyst, 2023). Additionally, removing SNS-related distractions seemingly helps productivity by releasing users from intrusive interruptions, which, according to our data, could occur as often as every five minutes. This observation is also consistent with IS findings on IT interruptions (Addas & Pinsonneault, 2018), which showed that reducing such interruptions can lead to notable productivity gains.

This effect can also be explained based on existing theoretical insights. From the perspective of self-regulation theory (Baumeister & Vohs, 2016), refraining from engagement with hedonic IT enables users to control impulsive checking behavior and regain control over their time and attention. When taking a break from use, individuals can preserve their mental resources, which then can help improve concentration on work or academic tasks. Furthermore, as explained by the cognitive resource framework (Glück & Bluck, 2007), users reduce (or remove) the cognitive load related to constantly switching between tasks and hedonic IT, a process known to disrupt task performance and increase cognitive strain. This conserved cognitive energy, or "buffer" - (Hobfoll, 1989), fosters users' ability to maintain focus on goal-oriented, productive activities (Adamczyk & Bailey, 2004). Besides, time allocation theory (Becker, 1965; Heckman, 2015) suggests that the time gained through abstinence—e.g., 3h 34 min per day on average—provides individuals with valuable time that can be redirected to productive pursuits, supporting meaningful changes in productivity. Given this, we hypothesize that:

Hypothesis 6: Hedonic IT abstinence maintenance leads to a positive change (delta2) in productivity.

The second salient outcome appears to be related to the users' intent for *moderation of use*. The qualitative analysis indicated that individuals make decisions to control their interactions with technology after abstinence. Many participants in our sample reported being more mindful of the potential adverse outcomes of SNS use after their abstinence and expressed their intention to follow a more moderated pattern of use in the future. The reasons provided were that the abstinence challenge created an opportunity to pause and reflect on ongoing (habitual) SNS use and assess its benefits versus costs. The longer abstinence continues, users reportedly were more confident and motivated to regulate their SNS use in the future: "*Since I've re-downloaded it, I have definitely used it a lot less which has helped with getting real work done. I also think I would be a better place without it." or "Since reactivating, I have found that I am using Twitter less than before as I have started to become accustomed to not using the app."*

This finding aligns with principles of habit discontinuity (Verplanken & Wood, 2006), which argues that when a habitual behavior is disrupted, people get an opportunity for intentional unconscious reflection on the behavior (Verplanken & Roy, 2016). In our context, taking a break from use provided the window for reflecting on their constant checking and scrolling and recognizing the problematic, excessive patterns of use. This deliberation can help diminish the automaticity of the hedonic use (Limayem et al., 2007) and help users return to a state of control characterized by the moderation of their engagement with hedonic IT (Abhari & Vaghefi, 2022). Also, from a dual-process theory view (Strack & Deutsch, 2004), abstinence improves users' capacity for self-control over a behavior. This occurs because disengagement from IT strengthens users' "reflective" system (system 2), which focuses on making deliberate and thoughtful decisions and managing impulse-based decisions, while weakening their "reflective" behaviors (system 2), which are mostly driven based on habits. Therefore, after a period of abstinence, users will be more likely to use system 2 while making decisions about using hedonic I/t and have more thoughtful interactions with it. Similar results have been reported in contexts such as alcohol abstinence (Wiers et al., 2015), smoking cessation (Litt et al., 2013) and dietary self-control (Hofmann et al., 2008). Hence, we expect that:

Hypothesis 7: Hedonic IT abstinence maintenance leads to a positive change (delta) in moderation of hedonic IT use.

The research model based on Study 1's results is presented in Figure 3; the adjacent Table 3 provides the conceptual definitions of the emerged constructs.

[2] Delta (Δ) represents productivity or intention to moderate use after abstinence minus before abstinence. Because the starting productivity of people and their intention to moderate use differs, we focus on the change in productivity or moderated use rather than on the productivity or moderated use at t2 per se (see also H9).

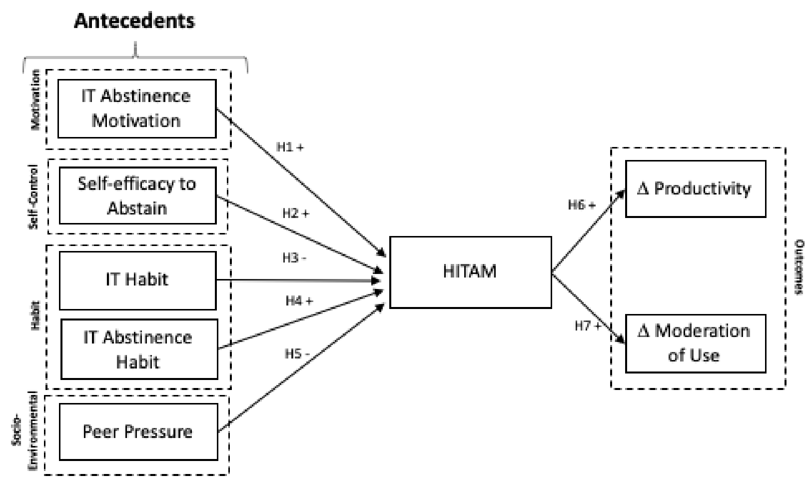

Figure 3. The Proposed Research Model

Table 3. Conceptual Definitions of Model Constructs

Antecedent/Outcome	Definition	References
IT abstinence motivation	Willingness to maintain an abstinence effort, despite the challenges.	(Deci & Ryan, 2008; Van der Heijden, 2004)
Self-efficacy to abstain	Belief in own's ability to abstain from hedonic IT use and maintain it.	(Bandura, 1977; DiClemente, 2006; Marlatt et al., 1995)
IT habit	The extent to which one acts upon previously learned automatic hedonic IT use.	(Limayem et al., 2007; Polites & Karahanna, 2012)
IT abstinence Habit	The extent to which routine behavior regarding hedonic IT abstinence maintenance is established.	
Peer pressure	The extent to which an individual is encouraged, pressured, and insisted on using hedonic IT by peers in their social environment.	(Robinson & Berridge, 1993; Santor et al., 2000)
Δ Productivity	Improvements in productivity due to the maintenance of hedonic IT abstinence.	(Adamczyk & Bailey, 2004; Addas & Pinsonneault, 2018)
Δ Moderation of IT use	Improvements in one's decision to moderate future hedonic IT use.	(Heather et al., 2010; Lozano et al., 2006)

4 Study 2: Quantitative Study of Hedonic IT Abstinence Maintenance

The aim of Study 2 was to provide empirical support for the proposed model via a quantitative survey study. Accordingly, we conducted a quasi-experimental study (i.e., no random assignment). We used two groups of participants: One group received a request to voluntarily participate in a hedonic IT abstinence challenge (intervention), and the other received a request to voluntarily participate in a study on SNS use with no mention of abstinence (control).

4.1 Sample and Procedure

The sample choice and data collection procedures were similar to those of the qualitative study (two questionnaires and, for the intervention group, a challenge between the two surveys). Participants were recruited via class announcements in three U.S. universities. Of these, 352 were allocated to the intervention group and received an invitation to participate in the challenge. Of those who volunteered to participate, 261 individuals successfully completed the challenge, or parts of it, and both surveys. For the control group, we invited 63 individuals to respond to two questionnaires, one week apart, on SNS use. Of these invitees, 50 participants volunteered to participate and successfully completed both surveys. We ran a series of t-tests that showed no significant differences between the intervention and control groups in terms of age, gender, type of SNS frequently used, amount of time spent on SNS use per day, and the number of times/day they accessed the site (all $p>0.1$). While there were no a priori differences between the groups, as expected, we found a significant difference between the intervention and control groups in abstinence maintenance (5.48 versus 0, t=20.4, p<0.0001). This confirmed the success of the experimental manipulation.

4.2 Measures

Most measurement items were adapted from well-established measures (Appendix E). Questionnaire 1 was composed of items measuring IT abstinence motivation (Miller & Johnson, 2008), self-efficacy to abstain, IT habit (Limayem et al., 2007), moderation of use (intention) (Bhattacherjee, 2001), and productivity (Tsai et al., 2007), as well as demographic information (age, gender, type of SNS, use hours, and frequency). Questionnaire 2 was composed of measurements to capture IT abstinence habit (Limayem et al., 2007), peer pressure (Santor et al., 2000), the outcomes (moderation of use and productivity), and social desirability bias (Reynolds, 1982). Hedonic IT abstinence maintenance was objectively captured based on the number of days between deactivation and activation of the SNS. This was reported by the individuals and was also independently recorded by a research assistant who monitored and recorded SNS account activities several times per day. Finally, we considered the effect of the IT artifact by controlling for the type of SNS that was reported as most frequently used.

Pilot Testing: Although the scales were adapted from established measures, we conducted a pilot study using a sample of 72 SNS users (41% female, 59% male; age: 18-21, M=19.1, SD=1.9) recruited from an introductory business class; half of them were asked to abstain from using their most frequently used SNS for up to one week. The results demonstrated that the scales were valid and reliable: all Cronbach's alphas were higher than 0.7, all loadings were above 0.7 (see Table E2 in Appendix E), and all cross-loadings were less than 0.3. Hence, we proceeded with the quantitative study.

4.3 Data Analysis

To analyze our data, we used Covariance-based Structural Equation Modeling (SEM). This analytical method was selected for the quantitative study due to its advantages over traditional methods (e.g., regression analysis), particularly in analyzing path diagrams involving latent variables with multiple indicators. SEM integrates the measurement model, which validates the constructs through observed variables (e.g., survey scales), with the structural model, which tests the hypothesized causal paths, into a single unified framework. This ensures that the hypothesized relationships are accounted for simultaneously with the measurement error (i.e., errors arising from the distinction between constructs and their measures) (Gefen et al., 2011). This helps ameliorate some of the biased inferences in traditional regression analysis.

Another key advantage of SEM for our study was its ability to handle models with multiple dependent variables and their interconnections, allowing for simultaneous testing of complex relationships. For this study, SEM was particularly valuable as our model involved both direct and indirect relationships between antecedents and outcomes of hedonic IT abstinence maintenance. SEM facilitated mediation analysis by estimating direct and indirect effects within a unified framework, enabling us to test how antecedents influenced outcomes through mediators while accounting for interdependencies across paths (Gunzler et al., 2013).

4.4 Results

Construct Validity and Reliability Testing: Descriptive statistics, kurtosis, and skewness indices, average variance extracted (AVE) scores, reliability scores, and inter-construct correlations are provided in Table 4. These indices demonstrate acceptable construct reliability (with Cronbach's alphas and composite reliability scores all above 0.7) (Cortina, 1993; Fornell & Larcker, 1981). The indices also support good convergent and discriminant validity, with the square root of AVE scores on the diameter of Table 4 being all above 0.7 and higher than the correlation of each construct with others in the model (Straub et al., 2004). Our analysis also showed no major deviations from normality, with absolute values of kurtosis and skewness being less than 1.48 for the constructs. In addition, a confirmatory factor analysis (CFA) using SPSS AMOS showed an acceptable fit for the measurement model (RMSEA=0.057 with a 95% confidence interval of [0.05–0.06]; SRMR=0.039; CFI=0.940; IFI=0.946; TLI=0.920; $\chi 2$/degrees of freedom (df)=2.42) (Hair et al., 2006).

Common method variance (CMV) could pose a threat to the validity of survey studies (Podsakoff et al., 2003). To reduce the likelihood of CMV, we measured independent and dependent variables at separate times (t_1 and t_2). Nevertheless, to check the possible presence of CMV, we used a common latent factor

(CLF) to capture the common variance of all indicators in the research model in the CFA model. We estimated two models, with and without the CLF, that showed small discrepancies (less than 0.2), suggesting that CMV is not likely to bias the results of our analysis (Podsakoff et al., 2003).

Table 4. Descriptive Statistics, Reliabilities, Square Roots of AVEs (Diagonal and Bold), and Correlations

		M (SD)	CR (Alpha)	Kurtosis (Skew)	1	2	3	4	5	6	7	8
1	**IT Abstinence Motivation**	6.18 1.12	0.92 0.91	1.12 -1.39	**0.89**							
2	**Self-Efficacy to abstain**	4.90 1.52	0.92 0.93	-0.78 -0.31	.22**	**0.84**						
3	**IT Habit**	3.98 1.27	0.91 0.89	0.91 0.96	0.06	0.09	**0.82**					
4	**Abstinence Habit**	3.98 1.48	0.95 0.95	0.91 0.96	.18**	.36**	.31**	**0.93**				
5	**Peer Pressure**	3.32 1.43	0.87 0.87	-0.50 0.30	-0.05	-.156*	-0.12	-0.04	**0.83**			
6	**Moderation of Use (delta)**	0.02 1.43	0.91 0.91	3.90 0.00	0.00	0.06	0.05	-0.04	-0.05	**0.88**		
7	**Productivity (delta)**	0.34 1.13	0.91 0.91	2.94 0.70	0.04	-0.05	0.06	-0.11	0.00	.16*	**0.88**	
8	**HITAM**	5.48 1.99	NA	0.29 -1.20	0.07	.33**	-0.10	.14*	-.14*	0.12	0.07	**1.00**
9	**Age (t_1) (C)**	21.92 4.62	NA	NA	0.09	.16*	.13*	.17**	-.13*	0.00	-0.06	0.01
10	**Gender (t_1) (C) (0=female)**	0.64 0.51	NA	NA	0.03	0.08	-0.10	.126*	-0.03	0.06	0.01	0.04

Note: Acronyms: M: Mean; SD: Standard deviation; CR: Composite reliability; Alpha: Cronbach's alpha; (C): Control
◆ Since the variables showed high kurtosis, we used log-transformed variables in the structural model testing.

Structural Model: Using SEM, we assessed the structural model while controlling for the effects of age, gender, type of SNS, and social desirability (see Figure 4) on the dependent variables. The indices indicated good model fit (χ2/df =2.38; RMSEA=0.015; SRMR=0.003; CFI=0.960; IFI=0.970; TLI=0.946). The path coefficients and significance levels show that all hypotheses except H1 were supported. Unexpectedly, we found that users' IT abstinence motivation did not have a significant effect on hedonic IT abstinence maintenance (HITAM) (H1: 0.067 [standardized regression weights], p=0.255) in the presence of the other antecedents. Nonetheless, self-efficacy to abstain showed a significant positive effect on HITAM (H2: 0.294, p<0.001). Regarding the role of habits, we found the effects of IT habit and IT abstinence habit to be significant. While IT habit had a negative effect on HITAM (H3: -0.210, p<0.001), IT abstinence habit had a positive effect (H4: 0.114, p=0.076). Finally, socio-environmental peer pressure exerted a significant negative effect on HITAM (H5: -0.118, p=0.042).

Regarding the outcomes, HITAM was positively associated with a positive change in productivity (H6: 0.106, p=0.096). Likewise, we found support for the significant effect of HITAM on positive change in intention to moderate use, as suggested by qualitative findings (H7: 0.127, p=0.055). The effects of control variables were largely non-significant (p>0.1), except for SNS type on HITAM (-0.089, p=0.089).

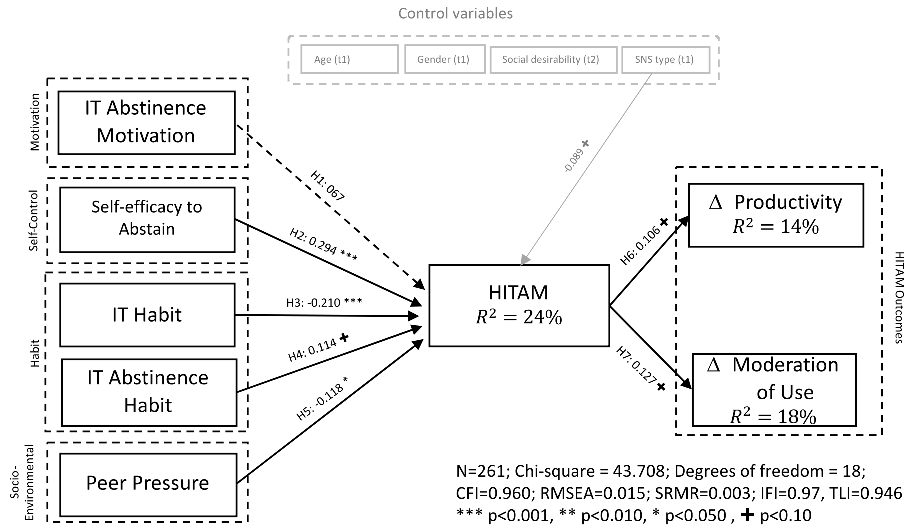

Figure 4. Results of SEM Analysis

To assess whether the IT abstinence intervention had an impact on increasing productivity (pre-abstinence versus post-abstinence) and moderation of use intentions, we used ANOVA in SPSS 25. We compared the intervention and control groups in terms of the target changes. The results showed that there were significant differences between intervention and control groups in terms of change in productivity ($M_{intervention}$ =7.65, $M_{control}$ =8.34, F=14.9, p<0.0001) and moderation of use ($M_{intervention}$ =4.20, $M_{control}$ =5.53, F=5.8, p=0.017), with the intervention group reporting significantly larger positive changes for both dependent variables. That is, the changes in productivity and intention to moderate use can be appropriately attributed to the intervention as opposed to natural learning.

Post-Hoc Analysis –Mediation Analysis: To check whether HITAM mediated the effects of the proposed antecedents and the outcomes, we conducted mediation tests (bootstrapping with 2000 samples). Results presented in Table 5 show that, indeed, HITAM fully mediated (significant at least at *p*<0.1) the relationships between most antecedents (self-efficacy to abstain, IT habit, IT abstinence habit, and peer pressure) and the outcomes of HITAM, except for IT abstinence habit and motivation. The indirect effects of IT abstinence habit and IT abstinence motivation on HITAM outcomes were not significant (>0.1).

Table 5. Mediating Effect of Hedonic IT Abstinence Maintenance

	HITAM→ Productivity (Δ)	HITAM→ Moderation of Use (Δ)
Hedonic IT Abstinence Motivation→	0.007 (not sig.)	0.009 (not sig.)
Self-efficacy to Abstain →	0.031 (p=0.057)	0.037 (p=0.085)
IT Habit→	-0.022 (p=0.050)	-0.027 (p=0.063)
IT Abstinence Habit→	0.012 -.001 (p=0.067)	0.014 (p=0.109)
Peer Pressure→	-0.013 (p=0.061)	-0.015 (p=0.092)

5 Discussion

Aiming to enhance the theoretical understanding of hedonic IT abstinence maintenance —where users initiate a temporary or permanent break from a select technology— this paper examined a nomological network of abstinence maintenance. In the absence of an overarching theory that goes beyond the individual's intentions, we adopted a mixed-method, deductive-inductive approach to provide a comprehensive perspective.

Based on a review of nine theories of behavior change, we first proposed a framework, highlighting key families of factors and a general category of outcomes. The qualitative study allowed us to refine the framework and capture a contextualized view of the factors underlying IT abstinence maintenance. The results pointed to specific factors related to users' motivation, self-control, habits, and environment, as well as the outcome of abstinence maintenance on productivity and moderation of use. These rich qualitative insights were helpful in grounding our hypotheses in the abstinence experiences of the participants.

The quantitative study then validated the refined framework using data from 261 SNS users. The assessment of the measurement model demonstrated that all constructs had good psychometric properties, and SEM analysis of the structural model provided support for most of the proposed hypotheses. Converging with qualitative findings, results confirmed the roles of IT habit, IT abstinence habit, self-efficacy to abstain, and peer pressure in explaining hedonic IT abstinence maintenance. We did not find the expected effect of IT abstinence motivation on HITAM to be significant. This could be the result of the study's design. It is possible that, while we emphasized the voluntariness of the challenge by encouraging individuals to participate in the study, we unintentionally created a condition of extrinsic motivation. Prior research has provided mixed and inconclusive evidence as to whether extrinsic motivation can generate a lasting behavior change (DiClemente, 1999). This highlights a promising avenue for future research to investigate abstinence behaviors in contexts devoid of external incentives (e.g., through experiments).

Additionally, aligned with qualitative observation, quantitative findings showed that abstinence maintenance leads to a positive change in productivity. This effect was in line with our expectations since maintaining a break from SNS should allow more time for and better concentration on productive tasks (Hall et al., 2019). Furthermore, we found the same impact on moderation of use; individuals' reflections on their use during the abstinence period can allow them to reassess their use and moderate their future use of SNS. This was consistent with prior results showing that the nature and extent of use may differ after one takes a temporary break from IT use (Cho, 2015) compared to the period before the break (i.e., moderated use vs. excessive use).

Together, the mixed-method, deductive-inductive approach we used complemented each other. To better illustrate the findings, as derived from the two exploratory and confirmatory approaches, we integrated the findings into the meta-inferences (see Appendix G). These meta-inferences can be used as an important first step toward understanding the maintenance of hedonic IT abstinence.

5.1 Contributions to Research

This paper makes three key contributions to research. First, it enriches the IS literature on post-adoption behaviors (Limayem et al., 2007; Ortiz de Guinea & Markus, 2009) by introducing the concept of hedonic IT abstinence maintenance, emphasizing the effort to sustain a break from technology use. Unlike prior research that focused on the "intention" to quit technology use (Maier, Laumer, Weinert, et al., 2015; Turel, 2015), we examine the "maintenance," addressing the important theoretical gap in understanding how these behaviors are sustained once intended. (Schwarzer, 2008). Our objective measure of abstinence maintenance, based on the number of days one manages to maintain a break from use, can be used in future research on corrective IS use behaviors.

Second, through a mixed-method approach, we extend our understanding of the etiology of hedonic IT abstinence maintenance by proposing and validating a research model. Our model captured the key antecedents of abstinence maintenance, including self-control, IT habit, IT abstinence habit, and peer pressure. We highlight the evolving role of habits, where prior use habits impede abstinence initially but are gradually replaced by abstinence habits that support sustained maintenance. Given that prior knowledge did not fully explain the maintenance of abstinence (Baldwin et al., 2006), our paper responds to calls to investigate hedonic IT abstinence beyond its initiation (Turel, 2015). Our exploratory research, which focused solely on the direct effects of antecedents, can serve as a foundation for future studies aiming to examine more complex relationships among the identified factors.

Third, by investigating the outcomes of hedonic IT abstinence maintenance, we inform various streams of research on IS use. We found that abstinence, once maintained, can lead to improvement in perceived productivity. This extends prior research that showed how excessive use of SNS can have detrimental effects on work and academic performance, as it takes users' attention and time away from crucial life activities. Our results complement these prior findings and cement the importance of hedonic IT abstinence maintenance as a valuable self-regulatory strategy to overcome SNS use challenges and maintain attention on productive tasks. We also found that maintenance of hedonic IT abstinence can increase intentions to moderate future SNS use. Abstinence appeared to provide an opportunity to reflect on their use and critically reassess their interactions. In this situation, participants reported being more mindful about their time and attention spent on IT use, contradicting prior findings about heavy users' tendency to underestimate the frequency and intensity of their IT use (Turel et al., 2018). The period of reflection enabled by abstinence maintenance not only results in moderated use, but it can subsequently lead to other positive outcomes such as reduced stress, anxiety, and burnout and reduced feelings of inadequacy and isolation (Weaver & Swank, 2019). As it increases willingness for mindful IT interactions, abstinence maintenance can ultimately lead to improved well-being and performance. These findings open avenues for future research to address the potential impact of abstinence maintenance on other problematic IT behaviors, such as IT misuse, security violations, or compulsive usage.

5.2 Implications for Practice

Our findings provide important implications for practice. First, they provide actionable steps for individual users who would like to maintain a break from use. After all, as suggested by prior research, compared to discontinuing IT use, taking breaks might be a more realistic response to counter excessive use.

Our findings highlight the factors that facilitate or challenge hedonic IT abstinence, which can empower them to take actionable steps toward successful and long-term abstinence. Key practices for maintaining hedonic IT abstinence include building self-efficacy, for instance, through internal or external encouragement (e.g., by parents or peers) and forming new habits around abstinence while also recognizing and mitigating the influence of prior habits and social pressures to use these technologies coming from the surrounding environment. Bolstering self-efficacy, or confidence in one's ability to abstain, and increasing their motivation can make individuals more resilient to temptation, as can developing alternative routines or activities that satisfy similar needs for relief, entertainment, or social connection.

The findings point to significant productivity gains due to abstinence. This can benefit users' personal, academic, and career lives, given that taking breaks can reduce distractions (during work or school activities) and allow for focused and uninterrupted attention to productive tasks. By fostering intentional breaks and replacing time spent on hedonic IT with rewarding offline activities (even if not work-related), users may find it easier to control their hedonic technology use and enjoy the resulting benefits in both productivity and well-being. This is key since research evidence showed that excessive IT use can tamper with work-family balance, work commitment, and academic performance (Turel & Qahri-Saremi, 2016).

The findings also demonstrate that in addition to productivity gains, abstinence maintenance increases users' decision to moderate their future use of hedonic IT. The effect was related to the contemplation and evaluation period abstinence maintenance provides. Therefore, to have healthier engagement with technology, taking abstinence can be a particularly effective strategy as it provides a basis for future use moderation. Therefore, having regular reflections on hedonic use, regularly assessing the outcomes of IT during use and abstinence periods, and planning periodic breaks (e.g., one day per week or month) can help improve individuals' tendency toward moderating use and building regulated, balanced interactions with technology.

For health practitioners, our results offer insights into the design of effective strategies and interventions for balancing users' interactions with technology. As the negative aspects of hedonic technologies become more recognized[3], hedonic IT abstinence surfaces as a viable approach to moderate one's usage behavior, an approach that can be less costly compared to other hard-core actions (e.g., cognitive behavioral therapy and rehabilitation centers).

Finally, our findings provide design implications for hedonic IT providers. To ensure that individuals' abstinence efforts are successful, it is crucial to provide the means for them to do so. This can be done, for instance, via features that facilitate voluntary (or even forced) deactivation when use is high, that allow setting abstinence maintenance goals, and that send warning messages when individuals try to reinitiate use before the set goal is met—all to establish moderated use. Nonetheless, for-profit technology providers may not necessarily be motivated to encourage responsible use of hedonic IT and may even make it harder for users to take such breaks from their technology (more use equals more revenue). In such circumstances, our results can inform policymakers in their efforts to regulate the IT industry to promote ethical practices that take into account the well-being of individuals, organizations, and society.

[3] For example, internet gaming disorder is now included as a "condition for further studying", in the Diagnostic and Statistical Manual of Mental Disorders (DSM) 5.

5.3 Limitations and Future Research

We acknowledge that this paper has limitations. First, our empirical investigations were done in one context, i.e., SNS was reported to be one of the most common technologies from which individuals choose to abstain (Turel & Vaghefi, 2020). Exercising caution and further examination are needed when applying our results to abstinence from other technologies and use behaviors. Second, we intentionally focused on the direct effects of antecedents on hedonic IT abstinence maintenance. Yet, it is conceivable that these factors may have more complex inter-factor associations, such as moderation or mediation effects. Moreover, additional factors (e.g., social, psychological, technological, organizational, or cultural) may also influence hedonic IT abstinence maintenance. The investigation of complex relationships, as well as additional factors, afford valuable research avenues and can complement our study to provide a complete picture of IT abstinence maintenance. Third, we focused on up to seven days of abstinence from IT, although abstinence can be maintained for longer periods. Future research could use longitudinal designs to examine the impact of these antecedents and outcomes over extended time periods. Fourth, our sample consisted of university students, given that the design of the study required close access to and monitoring of abstinence behaviors in addition to data collection in two waves. However, we recognize that focusing on university students may affect the generalizability of our implication. University students may experience unique social and academic pressures (e.g., higher peer pressure toward SNS use or school deadlines), influencing their SNS use and abstinence behaviors differently from the general population. Finally, some of the direct/indirect paths in our model were significant only at a 10 percent p-value; although the sample is acceptable for an exploratory study like ours (Wasserstein & Lazar, 2016), larger data collection could have enhanced the significance of these findings.

Future research should expand on this work by exploring the long-term effects of IT abstinence maintenance beyond the one-week period examined in this study. Longitudinal studies could provide deeper insights into how these antecedents and outcomes evolve over time. Additionally, examining IT abstinence maintenance in different technological artifacts, beyond SNS, would offer a more comprehensive view of maintenance behaviors. Researchers may also investigate more complex inter-factor relationships, such as mediation and moderation effects, which could deepen our understanding of how these antecedents interact to influence abstinence maintenance. In addition, we invite future research to expand participant selection to include diverse age groups and professional backgrounds, offering broader insights into the nomological network of factors affecting IT abstinence across varied demographics.

6 Conclusion

The use of hedonic IT, especially SNSs, has been consistently on the rise. Excessive use of hedonic IT has motivated many to try to abstain from these technologies. This study aimed to improve current knowledge of the factors related to the maintenance of IT abstinence by focusing on the key antecedents and outcomes of these behaviors. The mixed-method inquiry enabled us to provide novel insights regarding the importance of self-efficacy, IT habit, IT abstinence habit, and peer pressure in extending abstinence maintenance. The findings also highlighted the significant improvements in productivity and increased future moderation of use as a result of taking breaks from hedonic IT. We hope our study informs future research on hedonic IT abstinence maintenance and provides a basis for IS researchers to pursue this phenomenon across other related domains.

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Appendix A: A Review of Prior Research Related to Hedonic IT Abstinence

Citation	Dependent Variable	Independent Variables	Outcome(s)	Theory	Artifact
Turel (2014)	Discontinuance intention	Habit of using the site, addiction to using the site, self-efficacy to discontinue, satisfaction with the site, guilt	NA	Social cognitive theory	Hedonic IS (SNS)
Turel (2016)	Discontinuance intention	Guilt, subjective norms regarding discontinuance, attitude toward discontinuance, perceived behavioral control regarding discontinuance	NA	Theory of planned behavior	Hedonic IS (SNS)
Maier, Laumer, Weinert, et al. (2015)	Discontinuous usage intention	SNS-stress creators, SNS-exhaustion, switching-stress creators, switching-exhaustion	Discontinuance Behavior	Technostress literature	SNS (Facebook)
Maier, Laumer, Eckhardt, et al. (2015)	Discontinuance intentions	Social overload	Discontinuous usage behavior	Social support theory	SNS (Facebook)
Ravindran et al. (2014)	Social network fatigue	Platform-related, community-related, and self-related factors	Short breaks: controlled activity, suspended SNS	Fatigue research	Facebook
Zhang et al. (2016)	SNS overload and fatigue, SNS dissatisfaction	System feature overload, information overload, and communication overload.	Discontinuance intention	Stressor-strain-outcome	SNS
Vaghefi et al. (2020)	Discontinuance intention	Guilt, addiction, cognitive dissonance, self-efficacy to discontinue	NA	Cognitive dissonance theory	SNS
Luqman et al. (2018)	Discontinuous usage intention	Excessive social use, excessive hedonic use, excessive cognitive use, technostress, SNS exhaustion	NA	Stimuli-organism-response	SNS
York and Turcotte (2015)	Facebook break (binary variable: 0-No break, 1-took break)	Burden on time/resources, disenchantment with content, replacement with other innovation	NA	Diffusion of innovations	Facebook
Tromholt (2016)	1-Week Facebook break (compared to the control group with no break)	NA	Increased cognitive (life satisfaction) and affective (positive	Literature of user wellbeing	Facebook

Citation	Dependent Variable	Independent Variables	Outcome(s)	Theory	Artifact
			emotions) wellbeing		
Hall et al. (2019)	Social media abstinence	NA	Time spent on other activities, affective wellbeing, and quality of day	Theory of the niche and media displacement theory	Social media
King et al. (2016)	84 hours of internet gaming abstinence	NA	Beneficial outcomes (adjustments to gaming-specific activities); negative Outcomes (unwanted emotional and cognitive states and social isolation)	Literature on problematic Internet gaming	Internet games
Vanman et al. (2018)	5-day break from Facebook	NA	Reduced stress; reduced subjective wellbeing (due to social disconnection)	NA	Facebook
Stieger and Lewetz (2018)	4-day and 7-day abstinence	NA	Withdrawal symptoms (craving, boredom), relapses, and social pressure to get back on social media	NA	Online social media
Hanley et al. (2019)	SNS Vacation (1 week vs. control)	NA	Lower positive affect for active users and had no significant effects for passive users; no effect on life satisfaction	Literature on social wellbeing	SNS

Appendix B: Behavior Change and Maintenance Theories

To theorize about the factors underlying hedonic IT abstinence maintenance, we first reviewed prior literature. Considering abstinence as *a change to the existing user behavior*, we delved into the research that focuses on *maintaining a behavior change* in IS and reference disciplines (e.g., psychology and health). A review of this literature shows that, while there is no current theory of abstinence maintenance in IS, potential explanations can be provided by drawing upon multiple theories or models related to behavior change and maintenance that can guide us toward developing a preliminary framework. We first identified the theories that specifically focused on the factors of behavior change and maintenance and were used in theoretical and/or empirical studies of behavior change maintenance following an intervention (e.g., diet and weight loss, exercise, and physical activity, cessation of smoking or drug use). An overview of the identified theories and their explanation for behavior change and maintenance are provided in Table B1.

Table B1. An Overview of Identified Theories

	Reference	Theory	Explanation	Main Antecedents
1	Deci and Ryan (1985)	Self-determination theory	Individual behavior can be self-motivated and self-determined depending on one's innate tendency for growth.	• Motivation • Control • Competence
2	(Kanfer & Gaelick-Buys, 1991)	Self-regulation theory	To maintain a new behavior, one needs to pursue strategies in order to overcome barriers through self-monitoring, self-evaluation, and self-reinforcement.	• Standards, • Motivation • Willpower
3	Bandura (1982, 1991)	Social cognitive theory	Individual behavior is a subject of ongoing self-influence enabled by self-monitoring, self-judgment, and environmental forces.	• Cognition (attitude) • Behavior (skills, self-efficacy) • Environment (social norms)
4	Akers (1973)	Social learning theory	Individuals acquire motivations and skills to commit deviant behavior via observing others in their environment.	• Attitude • Skills • Reinforcers
5	Ouellette and Wood (1998); Verplanken and Aarts (1999); Verplanken and Orbell (2003)	Habit theory	New behavior, when consciously controlled over time, will turn into an automatic one and can be carried out without conscious awareness.	• Self-control • New vs. old habits • Environment
6	Strack and Deutsch (2004)	The dual process model of behavior	Individual behavior is controlled by two competing regulatory systems: reflective and reflexive systems	• Belief (attitude) • Habit (automatic behavior)
7	Baumeister and Heatherton (1996); Muraven and Baumeister (2000)	The strength model of self-control	Self-control is a finite human resource, and repeated efforts to restrain impulses and/or maintain a non-routine behavior will lead to its depletion.	• Motivation, • Self-control • Willpower
8	Hall and Fong (2007)	Temporal self-regulation theory	individuals tend to pursue behaviors that they believe are likely to have positive, immediate consequences.	• Intention, • Past behavior and habit strength • Perceived environment • Self-control
9	Becker (1974); Janz and Becker (1984)	Health belief model	Individuals' beliefs about health problems, perceived benefits of action and barriers to action, and self-efficacy explain engagement (or lack of engagement) in health-promoting behavior.	• Beliefs (risks vs. benefits) • Self-efficacy

We next integrated the findings based on these theories. We consolidated the identified antecedents into broad families of factors that could explain why individuals abstain from use. For instance, while a set of theories discussed individuals' motives and attitudes toward change, these were considered under one family of factors that considers "motivation" for change. The resultant families of factors (from these theories) included: *motivation, self-control, habit,* and *socio-environmental forces.* To validate the framework, we cross-checked each family with these nine theories and the empirical studies that used them in relevant contexts, such as maintaining a new exercise or diet. Based on the existing evidence, we mapped the families of factors onto the existing theories of behavior change and maintenance (see Table B2). These families of factors provided the basis for our framework of IT abstinence maintenance (Fig 2). The framework was first refined (Fig 3) and then tested via an empirical study.

Table B2. Theoretical Foundation for Studying IT Abstinence Maintenance

Theory / Family of Factors	1 SDT	2 SRT	3 SCT	4 SLT	5 HT	6 DPM	7 SMSC	8 TST	9 HBM
Motivation (Including beliefs, attitude, & intention)	✓	✓	✓	✓			✓		✓
Self-control (Including self-regulation, skills &self-efficacy)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Habit (Including prior behavior, old behavior, new habit)					✓			✓	
Socio-Environmental Forces (environment around individual, contextual factors)			✓	✓	✓	✓	✓	✓	

Note: **SDT**: Self-determination theory, **SRT**: Self-regulation theory, **SCT**: Social cognitive theory, **SLT**: Social learning theory, **HT**: Habit theory, **DPM**: Dual process model of behavior, **SMSC**: Strength model of self-control, **TST**: Temporal self-regulation theory, **HBM**: Health belief model

Appendix C: Questionnaire Guide And Coding Categories

Table C1. Guide

Questionnaire 1 (t_1)

Please provide written answers to the following questions. Please elaborate on your answers.

A) Have you ever continued to use a social networking site longer than originally intended? If yes, why do you think it happened?

B) Besides this exercise, did you previously try to get a break from your usage of social networking sites? If yes, explain why you did it, what you did, and how long did you last.

  a. Did your efforts work?

  b. What do you think could help you maintain your break from social networking site use? Please explain whatever you think may help.

  c. What might make it difficult to get a break from social networking site use for the time intended? Please explain any reason that you think may hinder you from staying away from social networking site use during that time.

*Please upload a screenshot of the deactivated social networking site. Please indicate the time the screenshot is recorded.

Questionnaire 2 (t_2)

*Please upload a screenshot of the reactivated social networking site. Please indicate the time the screenshot is recorded.

A) In your own words, please describe your experience with the social networking site abstinence challenge.

B) Did you find it difficult to stay away from this social networking site, or were you able to easily take a break for the whole (or most of the) week?

C) What made you go back quickly (recall what went in your mind right before you logged back) or helped you stay away for a longer time? Please be as descriptive as possible in your responses.

D) What did you achieve from participation in this challenge?

E) All in all, are you going to continue your abstinence? Why or why not?

Table C2. Coding Category and Subcategories

Coding Category		Example of Subcategories	% of Coded Responses
IT abstinence Maintenance		Abstinence event, abstinence success, abstinence failure, experience of abstinence	81%
Family of Factors	Motivation	Motivation to abstain, motivation to continue use, lack of motivation, attitude toward abstinence	22%
	Self-control	Self-ability(efficacy), monitoring, lack of control, self-control skills	35%
	Habit	prior habits, new habits, maintenance abstinence, dependence, addiction	27%
	Socio-environmental	Social duty, missing out, pressure from peers, cues from others' use	24%
	Other non-salient antecedents *	Stress, connectivity, anxiety, boredom, guilt, mood, personality, others	13%
	Outcomes	Long-term gain, short-term gain, productivity, future moderation, wellbeing, personal, professional, usage awareness	64%

**Note*: Although some participants noted these factors, they did not emerge as primary antecedents of abstinence maintenance, as they were mentioned less frequently compared to other antecedents.

Appendix D: Data Structures (Chains of Evidence)

Empirical observations	Theoretical observations	Theoretical concept
• I knew that I needed to do something like this [abstinence], at some point so when the opportunity came, I got excited! • For me personally, social media use is more of a time-waster/time-dump for when I'm bored. • When I log into social media, I feel so released. I think I don't want to try to stop using social media.	Individual's willingness to maintain an abstinence effort, despite the challenges (SNS *abstinence motivation*)	Motivation
• I knew that I would be able to control myself if I ever needed it, so I think that it was nice to have a detox period • I do enjoy checking Facebook and I do spend a lot of my time checking its updates, but I knew If I wanted to stop using it for any reason, I would be able to. It wasn't too difficult. • I can abandon anything any time I want so it was really easy to do the exercise. • This was an interesting experiment which proves to me that I am able to go a few days without Facebook. • I am happy to have it back, but now know that if needed, I could go without it pretty easily.	Belief in own's ability to abstain from SNS use and maintaining it (*Self-efficacy to abstain*)	Self-Control
• I found it difficult and broke [abstinence] pretty quickly. it was mainly because out of habit I opened the app on my phone and signed in without even thinking about the fact that I was not supposed to be using it. Evidently it was harder than I thought. • While I was on my phone, I would tap on the Instagram logo involuntarily and then was surprised I could not access the site. It was almost like it was ingrained in my muscle memory. • I often found myself opening the app without thinking, only to remember that my account was deactivated. Normally I open the app throughout the day with the intention of scrolling for a few minutes and wind up staying on for a lot longer than originally planned. • What I did realize, though, was that while studying or doing work on my computer, I would keep logging onto Facebook out of habit every time I wanted to look at something besides work for a few minutes. • I would automatically go to my app or the website and forget that my account was deactivated. It was weird to realize that I was going onto Facebook so automatically without even realizing it. • More than anything, I feel like it has become a habit, so without intention, I sometimes naturally just open the app up.	The extent to which one acts upon previously-learned automatic SNS use (*SNS habit*)	Habit
• In the beginning I was trying to open twitter app unintentionally. However, after I realized that I was making progress and tried not to open the twitter. First three days were harder...but after that I got used to it. • After deactivating my social media account, I had gone back to the application frequently and had forgotten that I didn't have access to my account. After a couple of days, however, it became easier for me to not check my account and no longer had the desire to check it nor think about it.	The extent to which routine behavior regarding SNS abstinence maintenance is established (*SNS abstinence habit*)	Habit

Empirical observations	Theoretical observations	Theoretical concept
• The reason I went back on it [SNS] was because my mother and sister sometimes contact me through the messenger. I can't ignore them, so I had to go back on it. • My friends or family kept saying that they tagged me in something, and I need to see it. • From the time I logged off Facebook, I got pressure from friends to keep up with the current social media trends. • During the week, I kept getting messages from friends about why I deactivated my account. So, those who are conscious of it are definitely more likely to have a hard time abstaining from social media • What really pushed me over the edge was social pressure from friends. My friends and I like to tag each other in funny videos on Facebook, and during the short span of time that my account was deactivated for, two of my friends asked me why, when they tried to tag me in a funny video, my account did not show up.	The extent to which an individual is encouraged, pressured, and insisted to use SNS by peers in their social environment (*Peer pressure*)	Social Environmental Forces
• I did not find it too difficult to stay away from Facebook for a week and actually got more work done in that week than I usually do. • Over the week, I also found that I was more productive because I was not spending as much time on social media. I usually check Facebook a few times per day and for a lot of that time, I see same information that I checked earlier. • I was able to concentrate on my studies without any distractions or temptations. It was absolutely valuable because it allowed me to prepare for a test! • Sometimes we just don't realize how much time we have wasted on social media. When we avoid the distraction from social media, we would be surprised how efficient we could be on our other works • Throughout my week without twitter, I felt slightly more productive as I wasn't spending as much time scrolling through my newsfeed out of boredom. I did not feel obligated to use twitter during the week which helped doing other things. • I felt that being away from that gave me more time to focus on studying because Facebook is a distraction while studying because it can be mindlessly scrolled through • The lack of Facebook helped me have a clear mind and allowed to focus on my schoolwork more. If the app was available to me, I would be going through the news feed instead of studying. • this experiment proved to me that I could be way more efficient in doing work without Facebook. • I did find the social experiment to be a bit of a challenge, but I did notice an increase in my productivity.	Improvements in productivity due to maintenance of SNS abstinence (Increase in Productivity)	outcomes
• Going through the week I realized just how many times a day I mindlessly check social media when I'm bored. I am going to use the challenge to better control my snapchat use. • Before deactivating my Facebook, I had no idea how dependent I was on the actual site. Don't get me wrong I love Facebook, I'm constantly logging to Facebook whether it's to stalk my friends, to look at a funny meme that I was tagged in or to post a new picture, but I never thought that I NEEDED to log on, now I know! • After a little while of not having my account, I became less distracted by thoughts of using Twitter and was able to spend more time paying attention to work. I also found that I was less attached to my phone than usual. While I did not deactivate any of my other social media accounts, I did not use them much more than I normally would. I'd like to keep my social media use down to a minimum, and I am hoping that now, even with my reactivated Twitter, I'll be able to decrease my attachment to the app. • Since I've re-downloaded it, I have definitely used it a lot less which has helped with getting real work done. I also think I would be a better place without it. • I think that the biggest takeaway from the challenge was thinking critically about how much time I spend on social media and how I could better spend that time. I will try being in the moment and not enjoying the present than online. • Since reactivating, I have found that I am using Twitter less than before as I have started to become accustomed to not using the app.	Improvements in one's decision to moderate future SNS use after abstinence (Increase in moderation of SNS use)	outcomes

Appendix E: Measurements

Table E1. Operationalizations of Constructs

Construct and source	Measurement Items
IT Abstinence Motivation (t_1) Liang and Xue (2010) Cronbach's alpha (Alpha)[4]: 0.90	Please indicate the extent to which you agree with the following statements: Strongly disagree (1) - Strongly agree (7) 1. I intend to take a break from use of this social networking site. 2. I predict I will take a break from use of this social networking site. 3. I plan to take a break from use of this social networking site.
Self-Efficacy to Abstain (t_1) Turel (2015) Alpha: 0.90	Please indicate your level of confidence (No confidence at all (1) - Extremely confident (7)) that if you wanted, you would be able to: 1. Abstain from using this social networking site within the next four weeks. 2. Abstain from using this social networking site within the next eight weeks. 3. Abstain from using this social networking site within the next three months.
IT Habit (t_1) (Limayem et al., 2007) Alpha: 0.91	Based on your experience with your social networking site, please indicate the extent to which you agree with the following statements: Strongly disagree (1) - Strongly agree (7) 1. Using this social networking site has become automatic for me. Using this social networking site is natural to me. 2. When I want to interact with friends and relatives, using this social networking site is an obvious choice for me. 3. I do not even think twice before checking this social networking site. 4. Using this social networking site is something I do almost automatically when I see my cellphone, computer or tablet.
IT abstinence Habit (t_2) (Limayem et al., 2007) Alpha: 0.91	Based on your experience with the abstinence exercise, please indicate the extent to which you agree with the following statements: Strongly disagree (1) - Strongly agree (7) 1. Taking a break from this social networking site has become automatic for me. 2. Not using this social networking site is now natural to me. 3. Abstaining from this social networking site now is something I do almost automatically when I see my smartphone, computer or tablet.
Peer Pressure (to use IT**) (t_2)** Santor et al. (2000) Alpha: 0.86	Please indicate the extent to which you agree with the following statements: Strongly disagree (1) - Strongly agree (7) 1. My friends could push me into using this social networking site. 2. I give in to pressure from others to use this social networking site easily. 3. If my friends are using this social networking site, it would be hard for me to resist taking a break from it.
Δ Productivity (t_1 and t_2) Tsai et al. (2007) Alpha: 0.87	To what extent do you agree with the following statements about your productivity: Strongly disagree (1) - Strongly agree (7) t_1: during last week. t_2: since the beginning of the abstinence challenge. 1. I have fulfilled my schoolwork responsibilities very effectively. 2. I have gotten my schoolwork done very well. 3. I have completed all of my assigned tasks very effectively.
Δ Moderation of Use (t_1 and t_2) Bhattacherjee (2001) Alpha: 0.89	At t_1: Based on your interaction with IT during last week, At t_2: Based on your experience during the IT abstinence challenge, please indicate the extent to which you agree with the following statements: Strongly disagree (1) - Strongly agree (7) 1. I intend to moderate using this social networking site in the next three months. 2. I predict I will moderate using this social networking site in the next three months. 3. I plan to moderate using this social networking site in the next three months.
Social Desirability Marlowe-Crowne scale	Please indicate whether the statements below are true or false with respect to yourself: True – False

[4] The Cronbach's alphas were calculated based on the pilot study (N= 72)

(Reynolds, 1982)	1. It is sometimes hard for me to go on with my work if I am not encouraged. 2. I sometimes feel resentful when I don't get my way. 3. On a few occasions, I have given up doing something because I thought too little of my ability. 4. There have been times when I felt like rebelling against people in authority even though I knew they were right. 5. No matter who I'm talking to, I'm always a good listener. 6. There have been occasions when I took advantage of someone. 7. I'm always willing to admit it when I make a mistake. 8. I sometimes try to get even rather than forgive and forget. 9. I am always courteous, even to people who are disagreeable. 10. I have never been irked when people expressed ideas very different from my own. 11. There have been times when I was quite jealous of the good fortune of others. 12. I am sometimes irritated by people who ask for favors from me. 13. I have never deliberately said something that hurt someone's feelings.

Table E2. Cross Loading

Factor	1	2	3	4	5	6	7
Abstinence Motivation_1	0.04	-0.04	-0.01	-0.01	0.01	**0.88**	0.03
Abstinence Motivation_2	0.01	0.06	0.03	0.02	-0.01	**0.94**	0.00
Abstinence Motivation_3	-0.02	0.02	0.02	0.02	-0.03	**0.93**	-0.04
Self-efficacy to Abstain_1	**0.94**	-0.12	-0.03	-0.08	0.04	0.02	0.07
Self-efficacy to Abstain_2	**0.96**	0.01	0.04	0.00	0.00	-0.01	-0.03
Self-efficacy to Abstain_3	**0.91**	0.10	0.03	0.05	-0.05	-0.02	-0.06
IT Habit_1	0.03	**0.92**	-0.05	-0.03	0.04	0.01	0.01
IT Habit_2	0.02	**0.93**	0.00	-0.02	0.00	-0.04	0.05
IT Habit_3	-0.02	**0.91**	-0.07	0.02	0.04	0.06	-0.01
IT Habit_4	-0.04	**0.90**	0.04	-0.03	-0.01	0.02	0.03
Abstinence Habit_1	0.02	-0.03	**0.95**	-0.02	0.05	0.01	0.00
Abstinence Habit_2	-0.01	-0.03	**0.97**	-0.01	0.01	0.03	0.00
Abstinence Habit_3	0.00	0.01	**0.95**	0.02	-0.01	0.01	0.01
Peer Pressure_1	0.04	0.02	0.00	0.06	0.04	0.00	**0.91**
Peer Pressure_2	-0.06	-0.03	-0.05	-0.06	0.03	0.04	**0.90**
Peer Pressure_3	0.04	0.11	0.06	0.05	-0.10	-0.05	**0.88**
Delta Productivity_1	-0.01	-0.08	0.02	**0.92**	-0.01	-0.01	0.05
Delta Productivity_2	0.01	-0.09	-0.03	**0.90**	0.04	0.00	-0.02
Delta Productivity_3	-0.05	0.08	-0.01	**0.91**	0.00	0.04	0.02
Delta Moderation of use_1	-0.01	0.04	0.01	0.02	**0.90**	0.02	0.02
Delta Moderation of use_2	0.02	0.03	0.00	0.05	**0.92**	0.01	-0.04
Delta Moderation of use_3	0.00	0.00	0.04	-0.03	**0.93**	-0.06	0.00

Appendix F: Common Method and Social Desirability

We followed a series of procedural and statistical remedies to minimize the threat of common method bias, including careful item choices, using different types of questions, randomizing the order of items, pre-testing, and temporal separation between independent and dependent variable measurement surveys. Next, we used a common latent factor (CLF) to capture the common variance of all indicators in the research model in the CFA model. We estimated two models, with and without the CLF, that showed small discrepancies (less than 0.2). Third, we examined the correlation matrix (Table 5) and procedure suggested by Pavlou et al. (2007). The rho correlations between our variables were significantly lower than the 0.90 threshold. This pointed to the minimal presence of CMV in our data.

To reduce social desirability in the data, we communicated clearly (in the research call and the consent form) the anonymous nature of the study. We ensured participants that no party would have access to any identifiable information. We also provided no individual compensation and repeatedly asked people to report things as they are and as they desire them to be. To check (posterior) if social desirability bias exists in our data, we computed Spearman correlations between social desirability scale scores and our dependent variables. All correlations were not significant, -0.11 ($p>0.05$), 0.12 ($p>0.05$), and 0.04 ($p>0.05$) with ITAM, delta productivity, and delta moderation of use, respectively. Therefore, we concluded that social desirability bias was not a significant issue in this study.

Appendix G: Meta-Inferences

Factors	Qualitative Study	Quantitative Study				Meta-Inferences	Explanation of the Results
		H	SRW	Sig	Sup		
Motivation	IT users may have various reasons for abstinence, which together form their motivation for abstinence. Stronger IT abstinence motivation helps achieve sustained abstinence.	H1: M→ HITAM	0.07	0.255	No	Unlike findings in QL, higher IT abstinence motivation was not positively related to HITAM in QN.	The discrepant results could relate to the design of the quantitative study because compensation provided for participation might have interfered with users' intrinsic motivation for abstinence and created a condition of extrinsic motivation. As explained by Deci and Ryan (2008), the effect of extrinsic motivation on sustained behavior change is complex and prior results are mixed (Sansone & Harackiewicz, 2000). Future research on this effect is warranted and can improve our current understanding of the effect of motivation on abstinence maintenance.
Self-control	Perceptions about one's ability to abstain help achieve hedonic IT abstinence maintenance (1 week, in our case).	H2: SE→ HITAM	0.29	<0.001	Yes	Self-efficacy to abstain from hedonic IT use positively relates to abstinence maintenance, as both QL and QN results support it.	We found consistent results in both studies confirming that one's belief in her or his ability to abstain will indeed lead to sustained maintenance of abstinence, presumably because self-efficacy affords maintenance of distal goals such as abstaining from SNS use for 1 week.
Habit	Prior IT habit promotes automatic use and challenges the maintenance of abstinence.	H3: ITH→ HITAM	-0.21	<0.05	Yes	When prior IT habit is strong, it triggers an automatic and habitual response to situations that cue IT use, interfering with an abstinence effort.	Results were confirmed across both studies; this is consistent with recent findings on IT habits. IT habits trigger automatic and habitual responses to a situation that cues IT use (e.g., a dull moment, waking up in bed), interfering with hedonic IT abstinence maintenance.
	As users' abstinence persists, they develop some degree of abstinence habit, which could encourage the maintenance of abstinence.	H4: AH→ HITAM	0.11	<0.10	Yes	IT abstinence habit is positively related to hedonic IT abstinence maintenance and appears to balance the negative role of prior IT habit.	As abstinence habits get stronger with time, the user will have less tendency to respond according to prior IT habits and thus will exhibit longer maintenance of abstinence. Stronger abstinence habits create a state of efficiency in cognitive processing required to make a decision about maintaining abstinence (Verplanken et al., 1998).

Socio-environmental Forces	The supportive or unsupportive environment in the form of peer pressure to use IT (or lack thereof) during abstinence could affect the length of users' abstinence.	H5: PP→HITAM	-0.12	<0.05	Yes	Pressure to use IT from users' peers acts as a barrier and negatively relates to hedonic IT abstinence maintenance.	Results were consistent across studies; hence, when many people in the surrounding environment are asking one to use IT, this will make maintenance of abstinence more difficult. The finding also appears to extend prior understanding regarding the role of socio-environmental forces, such as peer pressure, that promote SNS use and dependence (Przybylski et al., 2013) since they make people conform to group norms (Clasen & Brown, 1985), avoid negative states such as missing out, and ultimately break their abstinence.
Outcomes	As users have longer breaks from IT, they will experience the positive effect of HITAM on their productivity due to the time not spent on hedonic IT and fewer disruptions caused by excessive use.	H7: HITAM→DP	0.13	<0.10	Yes	As per QL results, QN results showed significant positive changes to productivity due to hedonic IT abstinence maintenance.	QL results indicated that HITAM leads to increases in productivity, which was supported via QN. We found that hedonic IT abstinence maintenance explained 14% of the DP variance. The finding is significant, given the relatively short period of abstinence from only one SNS. The findings correspond to recent studies that show the negative impact of excessive SNS use on students' GPA, measured in the following year (Turel & Qahri-Saremi, 2016). This confirms that HITAM is a valuable pursuit with highly practical outcomes.
	Maintaining abstinence enhances one's awareness of the benefits vs. dangers of hedonic IT use and increases one's intention to moderate this behavior in the future.	H6: HITAM→DM	0.11	<0.05	Yes	IT abstinence maintenance positively relates to users' willingness to moderate their hedonic IT use in the future.	Results regarding the effect of HITAM on DM were consistent across both studies. The results could relate to the fact that abstinence provided an opportunity for users to take a break, during which benefits of less frequent hedonic IT use such as reduced interruptions (Moqbel & Kock, 2018), increased focus on other tasks, and more time to do other important tasks became apparent. Increasing awareness about SNS use (benefits/costs) increases users' willingness to moderate their use in the future.

Notes: M: IT abstinence motivation; SE: Self-efficacy to abstain; ITH: IT habit; AH: IT abstinence habit; PP: Peer pressure; HITAM: hedonic IT Abstinence Maintenance; DM: ∆ Moderation of use; DP: ∆ Productivity; H: Hypothesis; SRW: Standardized regression weights; Sig: Significance level; Sup: Support for hypothesis; QL: Qualitative study; QN: Quantitative study

About the Authors

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