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Examining Duality of Habit in Continued Use of Information Systems across Multiple Use Contexts and Users' Profiles

Short Paper

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Abstract

The habitual use of information systems (IS) has gained increased attention over the last decade both in research and practice. Since habitual use signifies individuals' repeated interaction with IS, it holds the potential for IS users and organizations to maximize their return on IS investment. Recent meta-analysis results have highlighted mixed results due to differences in context, mediators, and theoretical models. Recent research has begun exploring the duality of habit to explain both positive and negative impacts of habitual behavior through the dual process theory of habituation and sensitization with promising results. Therefore, to help address the mixed results across studies, we propose a unified theoretical framework investigating habit's role in influencing users' cognitions and resulting continued use decisions across multiple contexts and user types.

Keywords: Habituation, sensitization, dual process, IS use, habit

Introduction

Habitual use of information systems (IS) has gained increased attention over the last decade both in research and practice (Jeyaraj, 2022). Since habitual use signifies individuals' repeated interaction with IS (Limayem et al., 2007), it holds the potential for IS users and organizations to maximize their return on IS investment. To add, while habitual IS use has been identified as the hallmark of the post-adoption phase (Jasperson et al., 2005), the role of habit in shaping forces driving continued use of IS has been understudied in the IS literature (Dhir et al., 2018; Mouakket, 2015; Venkatesh et al., 2012).

While multiple studies have examined the role of habit across different technologies, geographic regions, voluntariness level, and data collection methods, the "empirical results related to habit have been mixed" (Jeyaraj, 2022, p. 1). For instance, a recent meta-analysis proposed mediational relationships between habit and continued use decisions across 20 studies showed diversity in variables investigated as potential mediators. For example, perceived ease of use, usefulness, affect, attitude, enjoyment, satisfaction, inertia, resistance to change, social influence, and trust were examined. Nonetheless, the majority of the examined studies focused on classical Technology Acceptance Model (Davis, 1989) variables such as perceptions of ease of use and usefulness of IS as potential mediating variables. Furthermore, proposed mediational relationships were only supported in 50% of the studies, revealing inconsistency and in some instances contradictory results (for review see Jeyaraj, 2022). Therefore, although existing research has examined habitual IS use in a variety of contexts, a unified theoretical framework investigating its roles in influencing users' cognitions and resulting continued use decisions has yet to be offered and tested (e.g., Seo & Ray, 2019). Calls were made for future studies to identify and examine not only necessary mechanisms but also to establish the boundary conditions for these mechanisms (Jeyaraj, 2022).

The current research aims to fill the gap in the literature pertaining to habit's role in shaping neural and

psychological mechanisms underlying continued use decisions. We build upon the dual-process theory of habituation and sensitization (Groves & Thompson, 1970). This theory of response plasticity to repeated exposure to a stimulus posits that two processes, one decremental (habituation) and one incremental (sensitization), develop independently in people's minds and jointly influence the final behavioral outcome (Groves & Thompson, 1970). Given that IS use has positive and negative outcomes (Tarafdar et al., 2015), we expect the habituation-sensitization framework to inform researcher and practitioners on how users' perceptions regarding IS use outcomes are shaped in the presence of habit. Through the habituation path, habit could numb technology use negative outcomes' perceptions and consequently decrease motivation to stir away from technology (Soror et al., 2022). Simultaneously, through sensitization path, habit could intensify technology use positive outcomes' perceptions and consequently increase motivation to consume more technology (Soror et al., 2022).

Furthermore, we will extend the nascent attempts in the IS literature investigating the habituation-sensitization framework (Soror et al., 2022; Weinert et al., 2022) through empirically examining the habituation-sensitization framework and potential boundary conditions. More specifically, we will examine the model across multiple systems use contexts; namely utilitarian, hedonic, and dual-purposed (Wu & Lu, 2013) contexts, as well as across multiple users' personality profiles.

With respect to systems use contexts, systems could be categorized on where they fall on utilitarian-hedonism spectrum (Wu & Lu, 2013). Utilitarian systems are developed mainly to provide users with instrumental values in terms of efficiency and productivity [e.g., learning management systems (Ain et al., 2016), and enterprise-wide systems (Kim, 2009)]. Hedonic systems are developed mainly to provide users with enjoyment, relaxation, and pleasure [e.g., gaming (Teng, 2018), and social networking (Mouakaket, 2015)]. In between the aforementioned categories dual-purposed systems are developed to provide instrumental values and enjoyment at the same time [e.g., world wide web (Limayem et al., 2007), and mobile communication technology (Soror et al., 2015)]. Untangling the dual role of habit across different use contexts is especially important given the increase in problematic use of technology fostered by habitual use and dire need to reduce its negative impacts (Seo & Ray, 2019; Soror et al., 2015; Tarafdar et al., 2015; Whelan & Clohessy, 2020). The dual perspective of habit allows moving beyond current literature in explaining the paradoxical phenomenon of being stressed with technology yet continue its use. The current study emphasizes habit's role in increasing approach motivation (pull) toward technology mediated rewards while simultaneously decreasing avoidance motivation (push) away from negative technology outcomes, and consequently, increase the users' inclination toward continuing IS use. Examining the duality of habit across multiple use contexts would help establishing the generalizability of the phenomenon as well as resolve the inconsistent findings in the literature that could be shaped by the use context (Jeyaraj, 2022).

With respect to users' personality profiles, prior research has highlighted the importance of personality traits in shaping users IS use experiences (Blackwell et al., 2017; Schneider et al., 2012). For example, a number of personality traits can predispose users toward lower or higher levels of perceived dependency on IS use in utilitarian system, dual-purposed systems, and hedonic system use contexts (e.g., Horwood & Anglim, 2018; Kircaburun & Griffiths, 2018). Moreover, personality traits can predispose users toward lower or higher levels of perceived stress resulting from IS use in utilitarian system (Reinke & Chamorro-Premuzic, 2014), dual-purposed (Maier et al., 2019), and hedonic system use contexts (Xiao & Mou, 2019). The current study aims to investigate users' personality traits as potential boundary conditions. Rather than examining personality traits in isolation from each other we aim to examine personality traits from a configurational perspective. This will allow the coexistence and absence of multiple personality traits in a single user profile. To our knowledge prior IS literature has not investigated the role of different personality profiles in disposing users toward habituation and sensitization paths. As a result, while we build on the very recent efforts in the IS literature (Soror et al., 2022; Weinert et al., 2022) to guide our efforts for testing the habituation-sensitization theory across multiple use contexts, we explore the potential of possible users' personality profiles to serve as boundary conditions for such models.

To summarize, as we empirically examine the dual-process theory and its potential boundary conditions the current research can serve as basis for developing interventions for shaping continued use decisions and behaviors. In this proposed study, the choice of the 'push' and 'pull' forces is motivated by recent findings in IS literature highlighting stress related to systems use as an important 'push' force (Ayyagari et al., 2011; Maier et al., 2015), and dependency on IS as an important 'pull' force (Turel, 2015). To fill in the

forementioned gaps in the literature we present our theoretical background and model followed by our proposed study design.

Theoretical Background

The dual-process theory of habituation and sensitization postulates that repeated presentations of a stimulus invokes two processes in the mind. The first process is habituation which entails a response decrement to a repeatedly presented stimulus (Groves & Thompson, 1970). For example, through habituation, people that are repeatedly exposed to an alarming stimulus decrease their responses to such stimulus over time. The second process is sensitization which entails an increase in responsiveness to a repeatedly presented stimulus (Groves & Thompson, 1970). For instance, through sensitization, people become overly reactive to anything that reminds them of an addictive substance (Berridge & Robinson, 2016). These two inferred processes are assumed to be independent in that they are sub-served by separate brain systems and in the sense that either process can occur in relative isolation, depending on the stimulus, training, and individual differences. However, the two processes must interact at some point at or before the final common path to yield the net behavioral response tendency. Many studies provide support for the view that both habituation and sensitization are important for understanding behavioral outcomes of repeated stimulation (Groves & Thompson, 1970). In the current study, we define **habituation as a decrement in perceived salience of stressors associated with repeated IS use over time**, while we define **sensitization as an increase in perceived salience of incentives associated with repeated IS use over time**. We would like to emphasize and clarify the distinction between habituation and habit. Habit is defined as “learned sequences of acts that have become automatic responses to specific cues and are functional in obtaining certain goals or end states” (Verplanken & Aarts, 1999, pp. 104), while habituation is defined as “response decrements that results from repeated stimulation” (Rankin et al., 2009, pp. 136). It is important to clarify the conceptual difference between habituation and habit. This is needed to avoid any confusion that may occur due to the shared Latin root between the two notions. Whereas “habit refers to a form of associative learning that can take the shape of “If-then” relationship, habituation refers to a non-associated learning where responses are reduced in reaction to repeated stimulus without linking it to another stimulus, such as specific end states or outcomes.” (Soror et al., 2021, pp. 88). Therefore, while “habit” focuses on the reactive behavior an individual conducts due to a stimulus, “habituation” and “sensitization” refer to the mechanisms by which such reactions occur and to what level. A stimulus could be in the form of a received “notification” that a friend made a comment on social media application, or a warning message that ERP system failed to export data. Also, a stimulus could be in the form of an “event” such as using two-factor authentication to log into a system or failing to connect to a wireless network.

Scant attempts have been made in IS literature to examine habituation in relation to repeated stimulus administration (Sun et al., 2013; Vance et al., 2018). For example, Vance and colleagues (2018) examined users habituation to security warnings. Sun et al. (2013) found that repeated exposure to internet banner advertisements reduces the attention that internet users devote to banner ads, a phenomenon known as “banner blindness”. Outside the IS literature, habituation to stress has become an important topic (Grissom & Bhatnagar, 2009), and has been demonstrated in human beings’ response to repeated psychological stress (Wüst et al., 2005).

Moving from habituation to sensitization, recent studies have embraced the incentive sensitization perspective to explain dependency on IS (Soror et al., 2015; Turel, 2015). These studies emphasized that when IS users repeatedly engage in a rewarding experience users might develop constant desire to seek and pursue actions that generated such rewards. The users' brains undergo changes where they become more sensitive to IS use reward-cues until reaching pathological state of desire (dependency).

The IS literature has recently begun identifying the potential of the habituation-sensitization framework as a promising theoretical lens for examining the duality of habit (e.g., Soror et al., 2022; Weinert et al., 2022). For example, Soror and colleagues (2022) investigated the dual process theory of habit in the context of hedonic systems use where they examined the psychological effects of users repeated exposure to social media use. Weinert and colleagues (2022) examined the dual process theory of habit in the context of utilitarian systems use where they examined the psychological and physiological effects of users repeated exposure to enterprise content management system malfunctions. The recent efforts, while representing a push in the right direction, they only examined the duality of habit in one single system use context [i.e., hedonic (Soror et al., 2022) and utilitarian (Weinert et al., 2022) systems] at a time. This limits our

understanding of the generalizability of the phenomenon across different system use contexts such as dual-purposed systems. Moreover, the aforementioned recent studies did not inform the literature regarding the potential influence of users' personality profiles on their findings. Therefore, we propose examining a unified theory of habit through the lens of habituation and sensitization across multiple contexts and user profiles.

Proposed Research Model

Behaviors initiated out of habit economize on an individual's scarce mental resources and are carried out with minimum attention or awareness (Bargh, 1994). It follows that, strong use habits reduce cognitive load experienced by users and increase task performance efficiency (Limayem et al., 2007). Thus, as system usage frequency gets higher, the mental effort required to complete a task reduces due to learning. Moreover, guided by the goal of freeing up cognitive resources, perceptions associated with repeated exposure to negative experiences, such as use-related stress, will potentially be reduced in salience, until they eventually become unnoticeable (Anderson et al., 2016).

When habitual behavior is intrinsically rewarding, such behavior could turn problematic (Xu et al., 2012). Habitual technology use is strongly associated with IS dependency (Turel, 2015). When user repeatedly experiences the thrill of performing habitually rewarding system use behaviors, his or her brain may be sensitized to technology use related rewards (Soror et al., 2015). Thus, the brain can become more sensitive to use cues, and tend to overemphasize salience of immediate and short-term use-related thrills (Turel, 2015).

H1: *As the level of habitual IS use increases the levels of experienced IS use related habituation and sensitization are expected to increase .*

In a habitual system use environment, users are expected to build on their prior use experience and implement a "quick and dirty" heuristic processing to reach their continued use decisions (Kim, 2009). This sort of feedback loop is expected to link prior use behavior with current use evaluations and decisions (Kim & Malhotra, 2005). Based on dual-process theory we would expect that as habituation increases users would attenuate potential negative outcomes associated with IS use while as sensitization increases users would amplify potential positive outcomes associated with IS use. Consequently, we would expect that more favorable evaluations of the system use experience will take place and users would be more inclined toward using it in the future as the levels of habituation and sensitization would increase.

H2: *As the levels of IS use related habituation and sensitization increase the inclination toward continuing to use the system will increase.*

Moreover, we expect that in utilitarian system use contexts, characterized by extrinsic motivations such as perceived usefulness and punishment shaping continued use decisions (Wamba et al., 2017; Wu & Lu, 2013), the habituation path would be more pronounced relative to the sensitization path. For example, in the context of utilitarian systems, such as ERP system, the first few times utilizing the system users may have stressful experience. But over time via habituation users cope with the encountered stress and would be inclined to continue using the system to complete key tasks. On the contrary, a user experiencing strain from using a hedonic system for first few times, such as a video games or social media, typically would less inclined to continue their use. Therefore, we believe that habituation will exhibit a stronger effect on continued use decisions in the case of utilitarian contexts compared to hedonic contexts. But since sensitization pertains to the increase in the sensitivity to intrinsic reward cues rather than extrinsic goals, we expect the contrary of the aforementioned argument to be true for sensitization. The use of ERP system is not intrinsically rewarding in itself but playing a video game is. Therefore, we expect that in hedonic system use contexts, characterized by intrinsic motivations such as enjoyment and playfulness shaping continued use decisions, the sensitization path would be more pronounced relative to the habituation path.

H3: *Habituation will more strongly affect Continued Use Decisions in the context of utilitarian than in the context of hedonic systems use and vice versa for sensitization.*

While hedonic and utilitarian systems are typically presented as dynamically opposed to each other, our modern IT environment is typically composed of multiple systems that serve dual purposes in our day-to-day lives such as our mobile phones. These systems can support both utilitarian (e.g., Banking applications)

and hedonic (e.g., social media) tasks. Therefore, dual-purposed system use equally supports habituation and sensitization to different stimuli experienced through the system use.

Dual-purposed systems, similar to hedonic systems, facilitate an intrinsically rewarding system use experience (Wu & Lu, 2013). Consequently, dual-purposed systems enable users to garner benefits such as fun, pleasure, entertainment, and enjoyment through their system use. In contrast, utilitarian systems are not usually designed to drive fun or pleasure but rather for achieving better task performance and efficiency (Köse et al., 2019). As a result, we would expect the strong effect of sensitization on continued use decisions to carry over from hedonic system use context to dual-purposed system use context and be more pronounced in comparison to its effect in utilitarian system use context.

H4: Sensitization will more strongly affect Continued Use Decisions in the context of dual-purposed relative to in the context of utilitarian systems use.

Finally, dual-purposed systems, similar to utilitarian systems, provide an extrinsically rewarding system use experience (Wu & Lu, 2013). Therefore, dual-purposed systems offer users instrumental benefits in achieving task-related objectives. These benefits could be in the form of improved productivity, efficiency, and accuracy of performed tasks via systems use. In contrast, hedonic systems are not designed to be productivity or task-oriented technologies but rather leisure focused (Köse et al., 2019). As a result, we would expect the strong effect of habituation on continued use decisions to carry over from utilitarian system use context to dual-purposed system use context and be more pronounced in comparison to hedonic system use context.

H5: Habituation will more strongly affect Continued Use Decisions in the context of dual-purposed relative to in the context of hedonic systems use.

Our research model in Figure 1 below provides a visual depiction of our research hypotheses.

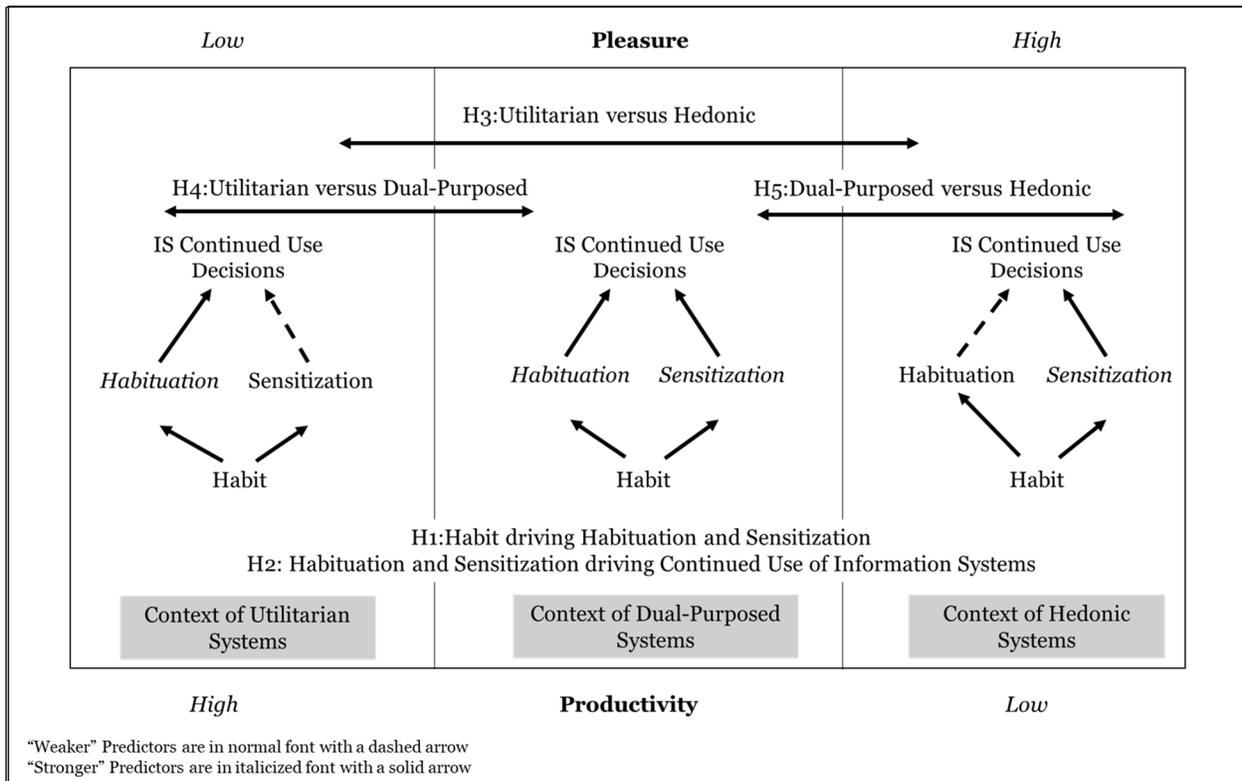


Figure 1. Research Model

Study Design

To address our objectives, we propose a survey-based research design to capture the focal constructs in the study with a variety of question types such as Likert scale, closed-ended, and open-ended questions to facilitate in-depth exploration of the phenomenon at hand. Participants will be recruited from both students and Amazon's Mechanical Turk to provide a diverse population of IS users to examine IS use behaviors across various contexts. This approach aims to increase the generalization of our research (e.g., Jia et al., 2017; Steelman et al., 2014; Soror et al., 2015). Additionally, we will examine technologies across three use contexts, namely, utilitarian (enterprise system users), hedonic (social networking sites), and dual purposed use (mobile phones). The study's constructs (e.g., Continued Use Intentions, Strength of Habit, Dependency, and Exhaustion) will be measured using well-established survey instruments when available and adapting the wording to the specific IS use context. Moreover, we will control for a number of variables known to potentially influence focal constructs in the study (e.g., age, gender, personality types, self-control capabilities, use duration, use extent, use frequency, social desirability, and other demographical information). A control variable will be added to the model to capture the differences between the two samples, if any, on the relationships between focal constructs. If the control variable is found to have no statistically significant impact on the model, the two samples will be pooled together. Otherwise, the two samples will be analyzed separately, and a path comparison analysis will be conducted, and differences among results will be discussed.

The data will be analyzed with multiple statistical methods such as Structural Equation Modeling (SEM) and configurational approaches such as qualitative comparative analysis (QCA). On the one hand, SEM will be used to test the research model and the mediational mechanisms through which habitual use influence continued use decisions. The use of SEM, especially Partial Least Squares (PLS) SEM has gained popularity in IS research as prominent exploratory tool for theory building (Durcikova et al., 2018; Gefen et al., 2011).

On the other hand, QCA will provide deeper insights about the different configurations of users' profiles and the different paths they would take to reach their continued use decisions in different use contexts. The adoption of a configurational analysis as a method is driven by the deployment of dual-process perspective in the current research. The dual-process postulates that habituation and sensitization interact to yield the net behavioral response tendency. This corresponds with one of the QCA fundamental pillars as a method to unravel complex phenomena; namely, conjunctural causation. This principle implies that conditions exert their impact in combinations rather than in isolation from each other. In other words, the resulting effects of conditions are determined based on how the conditions are coupled together rather than simple magnitude of each condition on its own (Kumar et al., 2022; Schneider & Wagemann, 2010). Through QCA we can investigate the relationship between different configurations (combination of conditions) and outcomes of interest. A fuzzy set QCA allows us to assign survey respondents' membership degrees, ranging from 0 to 1, in different conditions of interest (Ragin, 2000; Schneider & Wagemann, 2010). As a result, through identifying different configurations of users' profiles we can discover potential conditions that may serve as necessary, sufficient, or both for continued use decisions to take place.

Potential Contributions

From a theoretical standpoint, the proposed study will extend the research on continued use of technology in general. More specifically, the study will garner a deeper understanding of the neuro-cognitive mechanisms through which habitual usage impacts continued use decisions. To add, the study will contribute to the generalization of the dual-process theory of habituation-sensitization to IS field which will pave the way for future IS research to contextualize and extend the theory. We believe that it is important to understand the mechanisms governing repeated interactions between users and systems as steppingstone in understanding potential system-use related outcomes (e.g., task performance and user wellbeing). Furthermore, identifying different configurations of users' profiles and revealing the associated patterns of experiencing habituation and sensitization could potentially extend our understanding of which users' profiles are predisposed to different paths across different use contexts.

From a practical standpoint, the study could broaden the arsenal of approaches IS researchers and practitioners can use for reducing problematic technology use decisions and behaviors. Also, the findings could inform not only IS design but also organizational policies and practices. Study findings would direct practitioners' attention to monitoring users' psychological responses toward as well as the nature of users

repeated interactions with IS. For example, on the one hand, during new systems implementation it is imperative for users to get habituated to the repeated stress created by the challenges presented by initial system use and training. Passing the learning phase hump is needed in order for users to be able to appreciate the potential system benefit and continue to use the system. On the other hand, users should not get habituated to the repeated stress triggered by frequent system failure or technology related interruptions representing a hindrance to their task performance.

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