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Abstract

Most behavioral models used in information systems (IS) research have focused primarily on the role of conscious intentions in determining whether users will adopt or continue using a particular IS. Only recently have IS researchers begun exploring subconscious, automatic predictors of behavior such as habit. Perhaps the biggest constraint has been the lack of a universally accepted, theoretically based, and valid measurement instrument for the study of this complex psychological phenomenon. This paper builds on recent advances in the understanding of habitual behavior from social psychology, by proposing the development of an improved habit measure to be applied in an IS setting. The validated measure will then be used to examine how habit can counteract intentions and inhibit the adoption and use of systems that have been deemed important to a company's success. Specifically, we hypothesize that habitual use of an existing system will negatively impact both intentions to use, and actual usage of, a new system. By better understanding habit's inhibiting influence on IS acceptance, strategies can be developed for the specific purpose of breaking these preexisting habits, and encouraging the development of new ones.

Keywords: habit, technology acceptance, inhibitors to IS usage

Introduction

Much research has been conducted in recent years to try to determine the factors influencing user acceptance of information technologies. Most of the models that have been proposed are variants of theories taken from social psychology, which focus primarily on the role of conscious intentions in predicting future behavior. Until recently, little theoretical attention has been paid to other subconscious, automatic predictors of behavior such as habit. Even then, habit has often been confused with similar concepts such as the frequency of past usage behavior and IS experience level, resulting in a lack of habit measures with a high degree of reliability and validity. Previous IS research has also focused primarily on the role habitual behavior may play in *continuance* of usage of an existing information system, or similarly, how the development of habitual behavior toward a new system may lead to increased *future* usage. There has been little extrapolation to the concept that deeply ingrained habitual behavior toward an old system may *negatively* affect intentions and usage of a newly introduced one. Recent advances in the understanding of habit from social psychology can be useful in developing a more robust measure of habit as it relates to information systems usage. This measure can then be used to explore the relationship between habitual use of an outdated system and other factors affecting intention to use, and actual use, of a new system.

This study will incorporate elements from both the theory of planned behavior (Ajzen, 1985) and the technology acceptance model (Davis, 1989) perspectives in explaining how habit toward an old system can act as an inhibitor of new system use. It is proposed that a user may perceive a new system to be both useful and easy to use (as prescribed in TAM), and even voice *intentions* to use it, yet never see these intentions to fruition due to the subconscious role of habit. A strong habit may also have a direct negative impact on intentions themselves, potentially counteracting the influence of other antecedents in predicting intention to use a system. Given the paper's focus on situations in which habit leads to *innovation dissonance* (Rogers & Shoemaker, 1971), we will not investigate habit's role in negatively influencing the various antecedents of intention themselves, although we recognize that such relationships may exist and be worthy of future study.

Theoretical Background

Definition of Habit

Habit, in a non-IS specific context, has been 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, quoted in Møller, 2003, p.3), and as a tendency to repeat past behavior given a stable supporting context (Ouellette & Wood 1998). Habits may vary in scope; applying either to a variety of situations, or to one very specific and well-defined situation (Møller, 2003). While some researchers have felt that habits are nonvolitional and unintentional, others have pointed out that automatic, routinized behaviors, while often nonvolitional, can also be volitional and part of intentional behavior systems (Ouellette & Wood, 1998; Ajzen, 2002).

Previous Operationalizations of Habit

Despite a plethora of social psychology articles studying habit, there is still a huge need for a solid, theoretically based operationalization of the habit construct. Ajzen (2002), Verplanken & Orbell (2003), and Klockner et al. (2003) have all discussed limitations of the various operationalizations of habit appearing in social psychology literature:

- *Habit as frequent past behavior* (Triandis, 1980; Ouellette & Wood, 1998)
  This is probably the most commonly used measure of habit. However, while Triandis (1977) believed that habit strength could be measured by the number of times a person has already performed an act, and thus strength of habit grows with repeated performance of a behavior, Ajzen (2002) argues that simply because a behavior is repeated many times does not mean that it has been habituated. He states that "whether a frequently performed behavior has or has not habituated is an empirical question, and to answer it we need an independent and validated measure of habit" (p.109).

- *Habit as a scripted form of behavior* (Verplanken et al., 1997; Klockner et al., 2003)
  This measure has been referred to as the response-frequency measure of habit (RFM). Participants are presented with a number of habit-related situations (such as travel destinations) and are asked to respond as quickly as possible with the behavioral choice they associate with that situation. This method has weaknesses in that it requires a controlled research environment, cannot guarantee spontaneous answers, and places time pressures on respondents in order to "force" answers that are based on one's habits.

- *Habit as a self-reported measure* (see Verplanken & Orbell, 2003 for a list of references)
  In many studies, respondents have simply been asked to indicate how often they have conducted a particular behavior in the past "without awareness" or "by force of habit." Such a method is faulty in that it combines an estimate of behavioral frequency and habit strength into a single measure. One must also question whether the word "habit" in and of itself is truly understood in the same way by all respondents, as well as whether a respondent can accurately report on a behavior that by definition is subconscious (Klockner et al., 2003; Ouellette & Wood, 1998).

Verplanken & Orbell (2003, p.1316) felt that while existing self-report measures were inadequate, there was "no reason why habit strength might not be measured by means of self-reports." Thus they created the 12-item Self-Report Habit Index (SRHI) (see Table 1 in the Appendix), as a first attempt at incorporating all the various facets of habitual behavior:

- *functional / goal-directed* (this implies that to some degree, habits are intentional or volitional, and are associated with specific tasks; see Ouellette & Wood, 1998 and Møller, 2003 for further references)

- *history of repetition of behavior* (incorporates the idea that one must have regular opportunities to practice a behavior in order for it to become habitual)

- *automacity* (see Bargh, 1996; Wood & Quinn, 2002):
  - *difficulty of controlling behavior*
  - *lack of awareness*
  - *efficiency* (habits require little mental effort to execute, thus freeing mental capacity to do other things)

- *expression of one's identity* (not relevant in all contexts; see Hardcastle, 2003)

It is our belief that Verplanken and Orbell's scale is a promising alternative to existing habit measures, and can be further adapted and refined for use in IS research.

The Relationship Between Habit, Intentions, and Behavior

Ouellette & Wood (1998) suggested that action generation and control could follow two processes: (a) automatic repetition of past acts and (b) controlled, conscious reliance on behavioral intentions. This implies that habits and intentions jointly predict actions, and can either conflict or correspond. Their extensive review of past research indicated that in situations where habits are unlikely to develop or not well established, behavior should be guided by deliberative reasoning processes. However, in stable contexts with high opportunity to practice routinized responses, habits will be the most important predictors of behavior. This is because habits can be performed quickly, effortlessly, in parallel with other activities, and with minimal attention (Bargh, 1989 in Ouellette & Wood, 1998). They also found that habit could have a direct impact on intentions themselves, independent of other antecedents such as attitudes and social norms.

Habit and IS Usage

Though habit has been studied both directly and indirectly (Thompson et al., 1994; Venkatesh et al., 2000) in prior IS research, these studies have viewed habit as a positive influence on continued usage of an existing system. Further, with few exceptions (e.g., Limayem et al., 2001; Limayem et al., 2003; Limayem & Hirt, 2003), habit has been equated with either experience or frequency of past behavior, which we have already found to be an inadequate measure.

Gefen alluded to the idea that habitual usage of an existing system could potentially *interfere* with the adoption of a new one:

> In the broader case of adopting a new IT, the model implies that resistance to the adoption of a new IT may be in part due to habitual usage with a previous system. If this holds across IT, then from a managerial point of view, one way of increasing user acceptance of an IT, whether directly or through increased PU and PEOU, is to get the users in the habit of using it. This also means, however, that replacing an old IT might be harder than otherwise envisioned because it is not enough just to rely on the users' rational assessment that the new IT is more useful and easier to use. Rather, it is necessary also to overcome the force of habit, which this study has shown to be of comparable strength to that of the PU and PEOU. (Gefen, 2003, p.9)

Limayem et al. (2001) echo this view of the limitations of simply manipulating the antecedents of intention to encourage new behavior:

> What is important to recognize is that this empirically shows that as IT usage becomes more automatic, intention no longer plays a dominant role. Therefore, the need to improve or increase the type or degree of usage may not require cognitive arguments or training to demonstrate the usefulness or other antecedent factors of intention. Rather, techniques or tactics useful in breaking ritualized (habitual) behavior may be called for. (Limayem et al., 2001, p.284)

One could potentially argue that habit's interference with IS adoption is simply analogous to a low level of *compatibility* (defined by Agarwal et al., 2003, p.7 as "perceived cognitive distance between an innovation and precursor methods for accomplishing tasks") with the new system. However, we feel that habit can be distinguished from the various dimensions of compatibility (including compatibility with preferred work style, prior experience, existing work practices, and values) in that the existence of long-standing work practices and preferences in and of themselves do not indicate that a behavior has truly habituated (Ajzen, 2002).

Research Model and Hypotheses: Habit as an Inhibiting Influence

Proposed Model

The proposed model, shown in Figure 1, builds upon existing behavioral models used in the IS discipline, while incorporating the construct of "Counterintentional Habit" (Verplanken & Faes, 1999), which represents the concept of habit regarding the old system negatively impacting new system usage. The model includes relative advantage (defined by Rogers 1983 in Karahanna et al., 2002, p.329, as "the degree to which an innovation is perceived as being better than the alternative it supercedes"), perceived ease of use, and subjective norm as predictors of usage intentions. Subjective norm is included based on the findings of Triandis (1971) and others that this construct has more predictive power for new behaviors such as IS adoption.
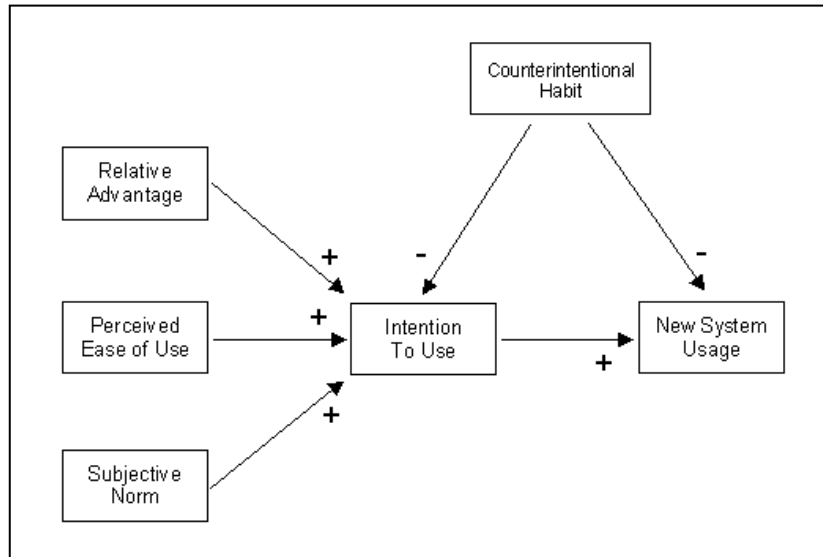
Figure 1. Proposed Model

Given that there is a plethora of prior empirical studies supporting the first four relationships (see Lee et al., 2003; Venkatesh et al., 2003 for a list of references), we posit them here for the sake of completeness:

H1:   Relative advantage will be positively related to intention to use the new system.
H2:   Perceived ease of use will be positively related to intention to use the new system.
H3:   Subjective norm will be positively related to intention to use the new system.
H4:   Intention to use the new system will be positively related to new system usage.

Counterintentional Habit and New System Usage

Previous IS studies have focused on providing a theoretical basis for including habit as a factor explaining continuance of an existing behavior (rather than as an inhibiting influence in predicting new behaviors). However, there is a widespread awareness that individuals' intentions can be overruled by habits when the latter are strongly ingrained in one's psyche.

The negative impact of habit has been associated with the theoretical concepts of *action slips* (Heckhausen & Beckmann, 1990; Betsch et al., 2004), *innovation dissonance* (Rogers & Shoemaker, 1971), *behavioral lock-in or inertia* (Barnes et. al., 2004), and *resistance to change* (see Hellriegel & Slocum, 2003). Even Fishbein & Ajzen, who in general have been resistant to incorporating the habit construct into either the theory of reasoned action or the theory of planned behavior, recognize the impact that habit may have on behavior, stating that "possible breakdown of the BI-B [behavioral intention-behavior] relation may be due to a person's *habits*. Although a person may intend to perform one behavior, 'by force of habit' he may perform an alternative one" (Fishbein & Ajzen, 1975, p.371, as quoted in Wittenbraker et al., 1983).

Overcoming the power of a habit may take much conscious, deliberate effort. This is particularly true when the "bad" habit has immediate short-term rewards whereas the new behavior has long-term benefits that are more difficult to conceptualize in the present. According to Ouellette & Wood (1998),

> When people's conscious intentions correspond to their habitual behavior, actions are likely to be cued directly by recurring features of the environment and to be relatively automatic. When intentions oppose habitual behavior, responses are likely to be directed by intentions only insofar as intentions are powerful enough to override the existing habits. New intentions need to be held with sufficient strength and implemented with sufficient skill to override well-practiced behavior. Continued control over performance is necessary until the new response is established with greater potency than existing habits. The continued effort required to shift well-established behavior patterns is exemplified in the adage for weight control that the price of thinness is constant vigilance. (Ouellette & Wood, 1998, p.66)

Drawing from the views presented above, Verplanken & Faes (1999) presented *counterintentional habits* as an additional (negative) predictor of behavior. Following their findings, we expect that for individuals possessing a strong habit toward using the old IS for a particular task, the negative influence of habit on the new behavior may outweigh the positive influence of intentions. Thus we posit:

> H5: *Habitual use of the old system will negatively affect new system usage.*

Habit's Impact on Intentions

Habit may have a negative impact on intentions themselves as well as on actual behavior. In the IS discipline, Thompson et al. (1994) pointed out that users could have positive attitudes toward a system, or see benefits to using that system, but still not intend to use it; *or* they may have the intention to use it but don't. Rogers & Shoemaker (1971) referred to this phenomenon as "innovative dissonance," "situations where use (or nonuse) of an innovation is inconsistent with the individual's attitude towards the innovation" (Thompson et. al., 1994, p.173; see another example in Barnes et. al., 2004). Further evidence of how the influence of habit can outweigh that of both attitude and social norms in predicting intentions can be found in Ouellette & Wood (1998) and Gefen (2003). Therefore we posit:

> H6: *Habitual use of the old system will negatively affect intention to use the new system.*

Methodology

Due to limitations in how the habit construct has been operationalized in past IS studies (see Table 1 in the Appendix for examples), as well as lingering questions concerning its proper dimensionality, we intend to use Verplanken & Orbell's (2003) Self-Report Habit Index as the basis for developing an improved measure tapping all facets of the habit domain. This new habit scale will undergo a rigorous series of validation tests before use.

Following scale development, we will test our research model in the context of a company on the verge of implementing a new business intelligence application, one which is intended to eventually replace the system currently in use, at least for certain tasks. Thus it is expected that both the old and new systems will be available to users throughout the time frame of the study. A survey will be administered to end users who are participating in the training program for the new system. The users will complete the habit portion of the questionnaire in regard to each goal-oriented task identified at the beginning of the study. They will also answer questions regarding their views of relative advantage, perceived ease of use, and subjective norm in regard to the new system, as well as their intention to use the new system, using well-established measures from the IS literature. Objective system usage information will be collected over several post-training intervals, for each task. Following data collection, structural equation modeling will be used to test the research model and hypotheses.

Discussion / Research Implications

This study has several implications for the IS research community. First, it builds on existing social science research to create a better, more complete operationalization of the habit construct that can be used in many IS research contexts in the future. Second, it is significant in being the first study to specifically examine the role of habit as an inhibiting influence in an IS behavioral context. Thus it will provide us with a better understanding of the habit construct and how counterintentional habit forces can impact usage behavior. This may lead to further studies of other inhibiting influences in the context of IS adoption, acceptance, and usage. Future studies could explore interaction effects between these constructs and intentions (following Limayem et al., 2001), as well as investigate the role that individual differences such as age and experience may have as antecedents to habit development.

The study will also provide practitioners with important insights concerning the multifaceted nature of habit, and its role in inhibiting the adoption and use of IS tools that have been deemed important to their company's success. This improved understanding will enable managers to develop strategies for the specific purpose of breaking preexisting habits, through intervention strategies designed to trigger subconscious behavior change and encourage the development of the desired new usage habits. Future studies could investigate the role of implementation intentions (see Gollwitzer, 1993; Verplanken & Faes, 1999), changes of context (as described in Møller, 2003), and various other IS intervention strategies (see Jasperson et al., n.d.) in bringing about such change.

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Appendix

Table 1. Previously Used Self-Report Habit Scales

Author	Comments	Scale
Gefen (2003)	Items were worded "to deal with the users' overall previous pattern of tendency and preference;" measured via a 7-point Likert scale.	1. "This is where I usually go to buy CDs/books." 2. "This is my preferred online CDs/books vendor." 3. "When I need to buy CDs/books online, this is where I go first." 4. "I often buy CDs/books online from this vendor."
Limayem & Hirt (2003)	Five reflective items aimed at measuring the extent to which the act of using a particular IS had become automatic for the respondent; measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree)	1. "The use of WebBoard has become a habit for me." 2. "I am addicted to using WebBoard." 3. "I must use WebBoard." 4. "I don't even think twice before using WebBoard." 5. "Using WebBoard has become natural for me."

Limayem et al. (2003)	IS habit is defined as "the extent to which using a particular IS has become automatic in response to certain situations."	1. "I use Blackboard as a matter of habit." 2. "Using Blackboard has become automatic to me." 3. "Using Blackboard is natural to me." 4. "When faced with a particular task, using Blackboard is an obvious choice for me." 5. "Using Blackboard has become a habit for me." 6. "It is a habit of mine to use Blackboard."
Verplanken & Orbell (2003)	12-item SRHI; recommended measuring on a scale with 5 or more response categories anchored by agree / disagree. (The authors tested their measure using both 7-point and 11-point scales.) The final identity item is optional, depending on relevance to the study.	Behavior X is something . . . 1. I do frequently. 2. I do automatically. 3. I do without having to consciously remember. 4. that makes me feel weird if I do not do it. 5. I do without thinking. 6. that would require effort not to do it. 7. that belongs to my (daily, weekly, monthly) routine. 8. I start doing before I realize I'm doing it. 9. I would find hard not to do. 10. I have no need to think about doing. 11. that's typically "me." 12. I have been doing for a long time.