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The Relationship between Habit and Intention in Post-adoptive IS Acceptance

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ABSTRACT

Although habit and intention have both been used to explain post-adoptive behaviors in IS acceptance research, their relationship remains unclear. The present paper provides definitions for the two constructs, identifies their differences and similarities, and hypothesizes that the correlation between the two constructs is stronger for non-reflective behaviors than for reflective ones. The results of a meta-analysis provide preliminary support for this hypothesis.

Keywords

Post-adoptive behaviors, IS acceptance, Habit, intention, meta-analysis.

INTRODUCTION

The concept of habit is particularly interesting for understanding post-adoptive behaviors in IS acceptance. As long as an individual performs the same behavior repeatedly in the same conditions, the chances of performing this behavior with little cognitive effort increase. As such, habit frees the mind from thinking about the habituated act, leaving more space in the mind for other tasks and increasing an individual's productivity.

The benefits of habit have led researchers to examine this construct for a variety of continuous behaviors such as reading online news (e.g. Kim, Malhotra and Narasimhan, 2005), using the www (e.g. Limayem, Hirt and Cheung 2007), and downloading music (e.g. LaRose and Kim, 2007). Interestingly, researchers have also included habit in theories based on reasoned action to explain and/or predict subsequent post-adoptive behaviors. As such, habit and intention have been examined as the most proximal predictors of post-adoptive behaviors.

However, there appears to be little agreement among researchers regarding the relationships between habit, intention and behavior. While some studies have argued for a direct relationship from habit to behavior, others have observed a moderating effect of habit on the relationship between intention and behavior, while others have found an indirect effect of habit through intention.

Given such mixed findings, the objective of the present paper is to examine and clarify the relationship between habit and intention in post-adoptive contexts. Based on a literature review of habit research, and the conceptual overlaps between how the two constructs have been defined, we hypothesize a stronger relationship between habit and intention for non-reflective, short-term behaviors than for reflective behaviors oriented towards longer term goals. A meta-analysis of past research on habit and intention provides preliminary support for this hypothesis.

HABIT AND INTENTION: A REVIEW

In order to understand the relationship between habit and intention, it is essential to clarify the two constructs. According to Barki (2008), researchers can follow four related approaches to specifying constructs by: 1) providing a clear definition; 2) specifying a construct's dimensions and their relationships; 3) exploring how a construct applies to alternative contexts; and, 4) expanding the conceptualization of a construct. Similarly, Suddaby (2010) has also noted that construct clarity includes four basic elements: 1) definition; 2) scope condition; 3) construct relationships; and, 4) coherence. Following these recommendations, we review the constructs of habit and intention in IS post-adoptive research and examine their similarities.

Scope definition

As habitual behavior is likely to have been performed several times (Verplanken and Orbell, 2003), new behaviors are unlikely to be influenced by habit. This is also consistent with research on habit much of which has been conducted in post-adoptive contexts, and in essence has found that habit explained additional variance in post-adoptive behaviors (e.g. continuing use). Interestingly, IS research has examined habit via a combination of the theories of reasoned action (e.g. Kim et al., 2005) and expectation-confirmation (e.g. Bhattacharjee, 2001). As such, habit researchers have generally incorporated intention in their models of post-adoptive behaviors. Since both habit and intention have been examined together in post-adoptive contexts, we focused the present study on post-adoptive contexts.

Conceptual definitions and measures

Habit

Although early conceptualizations of habit exhibited some divergence, recent conceptualizations and definitions appear to focus on the same set of elements, especially following Verplanken and Orbell’s (2003) review of habit’s conceptualizations and measures. Following these researchers, habit is viewed here as a mental construct that is functional and goal directed, difficult to control, executed without awareness and is mentally efficient (Aarts and Dijksterhuis, 2000; Verplanken and Orbell, 2003). Habit is also thought to develop by satisfactory repetitions of a behavior in stable contexts (Ouellette and Wood, 1998; Wood, Quinn and Kashy, 2002). In sum, when people repeatedly and satisfactorily perform the same behavior in response to a cue in a stable context, the link that is created in their mind between the cue and the behavioral response acquires a degree of automaticity (Verplanken, 2006). Table 1 provides a sample of definitions of habit from this literature.

Verplanken and Aarts (1999, p.104)	Learned sequences of acts that have become automatic responses to specific cues, and are functional in obtaining certain goals or end-states
Verplanken and Melkevick (2008, p.16)	A form of automaticity in responding, which develops as a person repeats a particular behavior in stable circumstances
Aarts and Dijksterhuis (2000, p.54)	Links between a goal and actions that are instrumental in attaining this goal. The strength of such links is dependent on frequent goal co-activation and relevant actions in the past

Table 1. Definitions of habit

Given the divergent conceptualizations of habit, different operationalizations of habit exist, such as frequency of past behavior, direct reports of habit strength, response-frequency measures, and self-report habit index, SRHI (Verplanken and Orbell, 2003). The comprehensive SRHI measure proposed by Verplanken and Orbell (2003) has been used in different contexts (Verplanken, 2006), and assesses habit by asking respondents whether the behavior in question is something: they do frequently, automatically, without having to consciously remember, that makes them feel weird if they do not do it, they do without thinking, that would require effort not to do, that belongs to their (daily, weekly, monthly) routine, they start doing before they realize they’re doing it, they would find hard not to do, they have no need to think about doing, that’s typically “them”, and they have been doing for a long time. In IS, habit has generally been operationalized as a behavior that has become automatic, natural, and an obvious choice when faced with a particular task (Limayem et al. 2007).

According to the present conceptualizations and past reviews on habit (e.g. Verplanken and Orbell, 2003 and Verplanken, 2006), this construct can be characterized by: a history of repetition, automaticity, pairing of stimuli and response, and situational constancy. Based on Bargh (1994), Verplanken and Orbell decomposed the automaticity component into lack of awareness, difficulty of controlling behavior and mental efficiency. In addition, Verplanken and Orbell (2003) viewed expression of identity as a feature of habit but noted that it might not be relevant for all behaviors.

It is important to note that frequency of use, pairing of stimuli and response, situational constancy and identity expression can be better viewed as necessary conditions for habit to exist, rather than to describe the construct of habit itself. Among all of habit’s characteristics that have been identified in the literature, only automaticity is a characteristic that relates to mental concepts (Rhodes and De Bruijn, 2010), i.e. it is the automaticity of the link between the frequency of past behavior, situational constancy and the stimuli-response pairing which creates the habit. Hence, it would be appropriate to assess habit in terms of automaticity, once the necessary conditions for its existence are satisfied.

Intention

Intention refers to “a person’s subjective probability that he will perform some behavior” (Ajzen, p.289). According to Tubbs and Ekeberg (1991), it can be described “as a cognitive representation of both the objective (or goal) one is striving for and

the action plan one intends to use to reach that objective” (p.181). Intentions can direct behavior consciously through controlled reasoning processes, and represent plans of action in pursuit of behavioral goals (Ouellette and Wood, 1998).

One’s intention gives an indication of how hard people are willing to try to perform a behavior and how much effort they plan to exert (Ajzen, 1991; Budden and Sagarin, 2007), and it has often been measured via respondents’ assessments of their own intentions, via items such as I plan to..., I want to..., or I intend to..., which entail planning and reasoning.

Fishbein and Ajzen (1975) identified four key elements of intentions: a behavior, a target object at which the behavior is directed, a situation in which the behavior is to be performed, and a time at which the behavior is to be performed. Variations in any of these elements change the nature of the intention and are thus likely to influence an individual’s response about their intention.

Comparing conceptualizations of intention and habit

Both of the above conceptualizations of habit and intention view them as mental constructs. In addition, the elements used to identify intentions are also applicable to the identification of habits since the latter is related to a behavior (sequences of acts), a target object (goals or end-states), and a specific time and situation (stable circumstances). However, not only is the presence of the four components necessary to form habit, but also a history of a link among them. For example, a person might intend to use Skype to chat with friends at home in the evening, regardless of whether he has chatted with them via Skype or not. However, a habit cannot be formed if the same behavior (using Skype) has not already been frequently performed in response to the same goal (chat with friends), and under the same circumstances (at home in the evening).

Further, automaticity is generally seen as an essential characteristic of habit, and based on Bargh’s (1994) work, Verplanken and Orbell (2003) decomposed it into lack of awareness, difficulty of controlling behavior and mental efficiency (i.e. freeing the mind to do other things). In contrast, intention is viewed as planning, willingness and reasoning which is reflected by high amounts of awareness (controlled reasoning processes), controlling behavior (action plans) and mental demands (reasoning and willingness to perform). As such, while habit is reflected by low levels of awareness and control, and by high levels of mental efficiency, the reasoning and planning process needed to form an intention is likely to be reflected by high levels of awareness and control, and by low levels of mental efficiency.

Relationships with other constructs

Antecedents

Based on the Theory of Reasoned Action and Expectation-confirmation theory, post-adoption researchers have identified the following antecedents of intention: Satisfaction (e.g. Bhattacharjee, 2001; Hong, Thong and Tam, 2006; Limayem et al., 2007), perceived usefulness (e.g. Bhattacharjee, 2001; Bhattacharjee and Premkumar, 2004; Hong et al., 2006; Limayem et al., 2007), attitude (e.g. Bhattacharjee and Premkumar, 2004), perceived ease of use (e.g. Hong et al., 2006), and four antecedents of habit: frequency of past behavior; satisfaction; stable context; and, comprehensiveness of usage (Limayem et al., 2007).

Frequency of past use, an antecedent of habit, is likely to have a direct influence on intention as well. According to Ajzen (2002), habitual behavior is guided by automatically activated intentions. In other words, the effect of past behavior on present behavior should be mediated by control variables in the Theory of Planned Behavior (TPB) (Ajzen, 2005). Accordingly, past behavior provides individuals with information which influences their beliefs about the behavior, which in turn determines the present behavior. However, some researchers found that past behavior explains additional variance in both intention and present behavior (e.g. Norman and Conner, 2006). According to Jasperson et al.’s (2005) model of post-adoptive use, use history is an antecedent of both intention and subsequent usage. In parallel, other researchers have also observed a significant relationship between habit and intention. For example, Elliott, Armitage and Baughan (2003) found a direct influence of habit on drivers’ intention to comply with speed limits in built-up areas, and Mullan and Wong (2009) observed a direct effect of habit on intention to prepare hygienic food. Thus, there is a general agreement that frequency of past use is an antecedent of intention.

Therefore, frequency of past use is a common antecedent of both intention and habit. More specifically, an increase in past use frequency is likely to lead to an increase in intention and habit.

Consequences

Usage intention is the most proximal antecedent of post-adoptive use that has been examined in the literature (e.g. Kim et al., 2005 and Limayem et al., 2007). Usage intention has also been used as a dependent variable in a number of studies and as a proxy for post-adoptive use (e.g. Bhattacharjee and Premkumar, 2004).

It is also important to note that there is little agreement among researchers regarding the relationship between habit and behavior, with some studies arguing for a direct relationship from habit to behavior (e.g., Jaspersen, Carter and Zmud, 2005), while others observing a moderating effect of habit on the relationship between intention and behavior (e.g., Limayem et al. 2007), and others finding an indirect effect of habit through intention (e.g. Elliott et al., 2003), which was later conceptually refuted (Limayem et al., 2007). Thus, while both habit and intention appear to influence post-adoptive behavior, the nature of their relationship is not clear.

Thus, past research on habit and intention appears to partly converge on the antecedents, dimensions, consequences, and conceptualizations of each construct. The commonality shared by the two constructs and their differences need clarification.

HYPOTHESIS DEVELOPMENT

According to the above review, habit and intention are cognitive constructs, are the best predictors of post-adoptive use, and share an important common antecedent: frequency of past use. They also share four elements that help specify them more precisely: a behavior, a target, a situation and a time. This suggests that, consistent with the results of past research (e.g. Limayem et al., 2007), the two constructs are likely to be correlated. Hence:

Hypothesis 1: Habit and intention will be significantly correlated.

Based on Activity Theory, behaviors can be classified into activities, actions and operations (Kuutti, 1995). Activity behaviors represent long-term processes that require high cognitive effort and necessitate several steps to be performed. Action behaviors represent relatively shorter-term processes that are oriented toward an immediate goal and require relatively high cognitive effort. Operation behaviors represent short-term processes that are performed fluently and frequently and that necessitate relatively low cognitive effort. For example, interacting with the WWW is likely to be an operation while purchasing a car online is likely to be an action. On the other hand, no activity behaviors can be found in IS research to the best knowledge of the authors.

Frequency of behavior is a common characteristic for habit and operation behaviors. However, while this characteristic is necessary for both constructs, it is not sufficient for neither. As described above, in addition to frequency, the formation of habit requires situational constancy, pairing of stimuli and response, and automaticity. Yet, none of these elements is necessary for operation behaviors (which are, according to TRA, best predicted by an individual's intention). For example, an individual might use Excel to perform calculations (which is likely to be an operation) but this behavior might not get "habituated" since the individual might, for example, normally use a calculator instead of Excel to perform his calculations.

Nonetheless, repeating the same behavior to meet the same goal is likely to increase the probability of pairing stimuli and response. For example, using a smart phone to play games frequently is likely to create a pairing between the stimuli of a "smart phone" and the response to "play games". Similarly, performing the same behavior frequently is likely to increase the probability of performing it when faced with the same circumstances, i.e., greater situational constancy.

On the other hand, as long as a context remains stable, a behavior that has been performed frequently in the past is likely to be performed again (Ajzen, 2002). Therefore, the individual's intention to perform the behavior again is likely to be high. For example, an individual who uses a smart phone to check his emails (pairing of stimuli and response) is likely to intend to continue using the smart phone in the future to check emails. Similarly, an individual who checks his emails at the office in the morning (situational constancy) is likely to intend to continue acting as such.

Similarly, an individual's automaticity in performing a behavior will be stronger in stable contexts (Ouellette and Wood, 1998). Therefore, a higher level of stimuli-response pairing and situational constancy is likely to lead to higher levels of both intention and habit. However, in the absence of these conditions, habit is not likely to exist.

Since the strength of these conditions increases with the frequency of behavioral performance, habit and intention are likely to correlate more strongly for frequently repeated behaviors than for less frequently repeated ones. According to Activity Theory, operations are performed more frequently and more fluently than actions and activities. Hence,

Hypothesis 2: The correlation between habit and intention is higher for operations than for actions.

The model of Figure 1 shows how intention and habit are hypothesized to be correlated in post-adoptive contexts. More specifically, an increase in the frequency of past behavior is likely to lead to an increase in intention and habit through the formation of pairing of stimuli and response and of situational constancy.

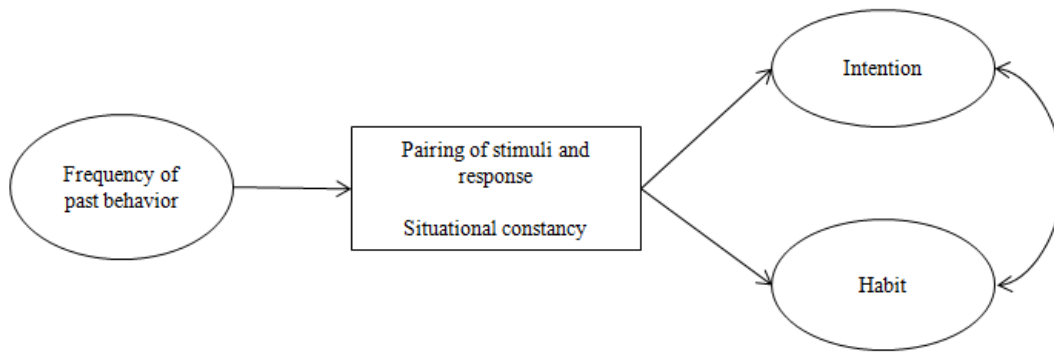


Figure 1- Research model

METHOD

Meta-analysis allows standardizing and comparing the results of different studies. As very few IS papers have investigated the effect of habit on post-adoptive use, we searched for studies published between 1998 and 2010 which examined, via a TRA- or TPB-based research model, the effect of habit on any type of behavior, and found a total of 44 studies.

Each of the 44 papers was coded via a coding sheet adapted from Lipsey and Wilson (2001). Accordingly, only one effect size per subject sample was employed. For studies that provided only the standardized coefficient Beta, Peterson and Brown’s (2001) formula was used to transform the coefficient Beta to a correlation coefficient (i.e., $r = \beta + 0.05\lambda$ where λ is an indicator variable that equals 1 when $\beta \geq 0$ and 0 when $\beta < 0$). Missing values were recovered via the EM (Expectation-Maximization) imputation method which is generally recommended for treating missing values (Gold and Bentler, 2000).

Some papers were removed from the analysis because they were judged inappropriate for the purposes of the present study, yielding 36 relationships suitable for further analysis.

We followed the procedures provided in Lipsey and Wilson (2001) and the formulas we used are shown in Appendix A. Each effect size was weighted by its corresponding sample size (formula 2). Then, effect sizes and weightings were corrected for unreliability (formulas 3 and 4). Next, the effect sizes were transformed to Fisher’s Zr (formula 5). Then, the mean effect size was calculated (formula 6), then transformed back into the standard correlational form for ease of interpretation (formula 7). For the mean effect size, the confidence intervals and the standard error were calculated (formulas 8, 9 and 10). To evaluate the significance of the overall mean weighted effect size, a z-test was conducted (formula 11).

To produce our results, we used the SPSS macros provided in Lipsey and Wilson (2001). In the present sample, habit was measured with the frequency of past behavior, SRHI (which includes one item out of 12 on frequency), and 11 other items that do not assess the frequency of past behavior. However, as argued above, habit is distinct from past behavior. Thus, in

order to eliminate any potential bias, the influence of habit on intention was examined for the whole sample, as well as for two subsamples by dividing the sample into mutually exclusive categories based on the moderator variable. The homogeneity among effect sizes within the categories and the differences between the categories was tested via ANOVA analog. We used a mixed effects model which assumes that the variability in effect sizes is attributed to systematic differences due to the presence of moderators, sampling error, and an additional random component. According to Cafri et al. (2010), a meta-analysis study should implement random-effects models given their greater validity from an inference standpoint.

RESULTS

The results of the meta-analysis are provided in Tables 2 and 3.

Samples	Full sample	Studies which measured habit as frequency of past behavior	SRHI	Other
# Studies	35	16	9	10
Mean ES	0.61***	0.58***	0.57***	0.73***
Z (significant?)	16.25 (Yes)	10.28 (Yes)	7.88 (Yes)	9.98 (Yes)
-95% CI	0.54	0.47	0.43	0.58
+95% CI	0.69	0.69	0.71	0.87
Q	324.14	N/A		
Q Between	N/A	3.30		
QW (Homogeneous?)	N/A	30.58 (No)		

Table 2. Meta-analysis results for “Habit measure” as the moderator

*: p<0.1; **: p<0.01;***: p<0.001

As can be seen in Table 2, the z-test value is statistically significant for the whole sample, as well as for each of the three subsamples. In addition, the 95% confidence interval around the mean effect size does not include zero and indicates the relative precision of the estimate of mean effect sizes. According to Cohen (1990), the mean effect sizes of Table 2 suggest medium to large correlations, and support H1.

The test for homogeneity for the whole sample indicated that the differences in the individual effect sizes might be due to some moderating variables besides random sampling error. Therefore, based on the present paper’s hypotheses, we examined “the nature of the behavior” (i.e., operation or activity) as a potential moderator.

In order to classify the behaviors of the present sample into operations and activities, a card sorting analysis was conducted. To do so, a panel of 15 judges were asked to classify the behavior of each study into the operation-action-activity categories of AT. Based on the judges’ classification, only one study had examined an activity behavior, and was therefore excluded from the next analysis.

The results of the analysis which examined the nature of the behavior (operation vs. action) are provided in Table 3. Based on Cohen’s (1990) rules of thumb, the magnitude of the effect size for the habit-intention relationship is medium to high for operations, and low for actions. Thus, the intention-habit correlation is stronger for operations than for actions, supporting H2. It is important to note, however, that due to the small number of action behaviors in each group of habit measurement (a maximum of one or two studies each), it was impossible to compare the results for each group.

The nature of the behavior studied in the article	Action	Operation
# of studies	4	32
Mean ES	0.40**	0.63***
Z (significant?)	3.41 (Yes)	16.71 (Yes)
Q Between	N/A	3.58*
QW (Homogeneous?)	N/A	33.1 (No)

Table 3. Meta-analytic results for the moderator “Nature of Behavior”

*: p<0.1; **: p<0.01;***: p<0.001

DISCUSSION AND CONCLUSIONS

Most prior studies on habit have examined its influence via the theories of reasoned action, such as TRA or TPB. The present paper contributes to the IS field by showing that a strong correlation exists between habit and intention and that this correlation is higher for behaviors that are performed fluently and frequently and require low cognitive effort than those that are performed with higher levels of cognitive effort and that are oriented toward specific goals. The paper also provides a theoretical explanation for this correlation that is based on stimuli-response pairing and situational constancy which are likely to be stronger for operations than for actions.

Several limitations of the present study need to be acknowledged. First, due to the small number of IS papers that examined habit, our results were also influenced by papers that examined any type of behavior in non-IS contexts. However, we do not expect results to be unsimilar in IS contexts because our sample includes various behaviors in various contexts including also a small sample of IS behaviors. Second, since only a few papers examined actions in each subsample, we could not compare the habit-intention correlations of papers that examined habit with a measure that does not assess frequency of past behavior. However, the results of Table 2 show a significant difference for both types of behaviors.

The results of the present paper might be informative for future research on post-adoptive behaviors. First, future research might want to examine the existence of factors other than situational constancy and pairing of stimuli which might also help explain the habit-intention correlation. Second, the present paper distinguished habit from past behavior. Thus, IS scholars might want to rethink the measurement of habit by excluding frequency of use from its operationalization. Third, the correlation between habit and intention should be taken into consideration in research models that explain or predict post-adoptive behaviors.

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APPENDIX A

Description	Formula
(1) Effect size	$ES_r = r$
(2) Inverse variance	$w = \frac{1}{SE^2}$
(3) Correction for unreliability for ES	$ES'_r = \frac{ES_r}{\sqrt{r_{xx}}\sqrt{r_{yy}}}$
(4) Correction for unreliability for w	$w' = w(r_{xx})(r_{yy})$
(5) Fisher's Z, transformation	$ES_z = .5 \log_e \left[\frac{1 + ES'_r}{1 - ES'_r} \right]$
(6) Mean effect size	$\overline{ES} = \frac{\sum(w_i ES_i)}{e^{2ES_z} + 1}$
(7) Inverse of the Z, transformation	$r = \frac{e^{2ES_z} - 1}{e^{2ES_z} + 1}$
(8) Standard Error of the Mean Effect Size	$SE_{\overline{ES}} = \sqrt{\frac{1}{\sum w_i}}$
(9) Confidence Intervals Lower Limit	$\overline{ES}_L = \overline{ES} - z_{(1-\alpha)}(SE_{\overline{ES}})$
(10) Confidence Interval Upper Limit	$\overline{ES}_U = \overline{ES} + z_{(1-\alpha)}(SE_{\overline{ES}})$
(11) Z-test	$z = \frac{\overline{ES}}{SE_{\overline{ES}}}$
(12) Homogeneity Test-Q statistic	$Q = (\sum w_i ES_i^2) - \frac{(\sum w_i ES_i)^2}{\sum w_i}$