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Do We Behave Based on Our Implicit Attitudes? Proposing a Research Model and an Experimental Study to Investigate Their Influence on Behavioral Intentions

Christoph Weinert
Otto-Friedrich University Bamberg, christoph.weinert@uni-bamberg.de

Christian Maier
Otto-Friedrich University Bamberg, christian.maier@uni-bamberg.de

Sven Laumer
Otto-Friedrich University, sven.laumer@uni-bamberg.de

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DO WE BEHAVE BASED ON OUR IMPLICIT ATTITUDES? PROPOSING A RESEARCH MODEL AND AN EXPERIMENTAL STUDY TO INVESTIGATE THEIR INFLUENCE ON BEHAVIORAL INTENTIONS

Weinert, Christoph, Otto-Friedrich University Bamberg, An der Weberei 5, 96047 Bamberg, christoph.weinert@uni-bamberg.de

Maier, Christian, Otto-Friedrich University Bamberg, An der Weberei 5, 96047 Bamberg, christian.maier@uni-bamberg.de

Laumer, Sven, Otto-Friedrich University Bamberg, An der Weberei 5, 96047 Bamberg, sven.laumer@uni-bamberg.de

Abstract

Attitudes are one of the three most-frequently studied independent variables to explain user behavior. However, although psychological literature distinguishes between explicit and implicit attitudes, most of the investigations in the research stream of IS acceptance and usage have a pure focus on explicit attitudes and do not consider implicit attitudes. Explicit and implicit attitudes can be contradictory and both might predict behavioral intention. Therefore, the present research-in-progress focuses on closing the research gap of refraining to differentiate attitudes in explicit and implicit attitudes and hence examining the influence of implicit attitudes on user behavior. Based on the Implicit Association Test (IAT) and surveys, we propose an experimental setting that measures explicit and implicit attitudes to validate the research model. The proposed research might contribute to the research stream of IS acceptance and usage by better predicting behavioral intentions by also considering implicit attitudes. Future results might explain distorted predictions of behavior and reduce the intention-behavior gap. Furthermore, the present research-in-progress introduces a suitable method to measure implicit attitudes.

Keywords: implicit attitudes, explicit attitudes, implicit association test, behavior intention

1 Motivation

One major objective of information system (IS) research is to predict and explain IS acceptance and usage (Williams *et al.*, 2009). The acceptance and usage of an IS is heavily influenced by users' attitudes towards the IS (Davis *et al.*, 1989; Yang and Yoo, 2004; Zhang *et al.*, 2008). Different theories and acceptance models such as the technology acceptance model (TAM) claims that, among others, explicit attitudes determine the intention to use an IS and in turn the actual usage behavior (Davis *et al.*, 1989). In IS research, explicit attitudes are one of the three most considered independent variables to explain the intention to use an IS (Jeyaraj *et al.*, 2006).

However, although the distinction between explicit and implicit attitudes in social psychological literature (e.g., Greenwald and Banaji, 1995; Gawronski and Bodenhausen, 2006; Gawronski *et al.*, 2006; Devos, 2008), most of the investigations in the research stream of IS acceptance and usage have a pure focus on explicit attitudes and do not consider implicit attitudes (for an literature overview see

Krönung *et al.*, 2013). Psychological research distinguishes explicit and implicit attitudes, and indicates that for example discriminatory behaviors are better predicted by implicit rather than by explicit attitudes (Fazio *et al.*, 1995; McConnell and Leibold, 2001). Implicit attitudes are unconscious and involuntarily formed, favorable or unfavorable feelings towards stimuli objects (Greenwald and Banaji, 1995), whereas explicit attitudes are conscious and can be declared by the individual personally. Technology use might also be influenced by unconscious factors such as implicit attitudes (Kim, 2009).

Several authors call for a greater consideration of attitudes in the IS discipline (Yang and Yoo, 2004; Zhang et al., 2008). To address this shortcoming the present research-in-progress focuses on closing the research gap of refraining to differentiate attitudes in explicit and implicit attitudes and hence examining the influence of implicit attitudes on user behavior. By neglecting implicit attitudes and only considering explicit attitudes towards an IS the prediction of behavioral intentions might be distorted, because individuals might be more favorable or unfavorable adjusted towards the IS than they are consciously aware of. Explicit and implicit attitudes can be contradictory (Albarracin *et al.*, 2008), such that explicit attitudes might be favorable and implicit attitudes unfavorable, which play a crucial role in predicting the corresponding usage behavior. Furthermore, the determination of IS acceptance and usage might be more precise by considering implicit next to explicit attitudes (Wilson *et al.*, 2000). Therefore, the present research-in-progress aims to introduce the concept of implicit attitudes in IS acceptance and usage research and proposes a suitable method and experimental setting to show the existence of implicit attitudes and how they influence behavioral intentions. Hence, the research question is:

> *What are implicit attitudes and how do they influence behavioral intentions towards IS usage?*

The remainder of this research-in-progress paper is as follows. First, we explain the theoretical background of the examination by describing the model of cognition and demonstrating the differences between explicit and implicit attitudes. Afterwards we outline central prior literature and develop our hypotheses. Following this, the methodology with the introduction of the implicit association test as well as the description of the experiment is demonstrated. Lastly, the next steps of the research-in-progress paper and its expected contributions are outlined.

2 Theoretical Background

First, we present the model of cognition, which is the underlying explanation of the existence of explicit and implicit attitudes. Then, we explain how explicit attitudes differ from implicit ones. Finally, prior literature studying attitudes in the research stream of IS acceptance and usage is summarized shortly to demonstrate the important role attitudes have in the understanding of IT usage behavior.

2.1 The model of cognition

The model of cognition is based on different psychological models such as the multi-store model (Atkinson and Shiffrin, 1968) and distinguishes human memory into short-term and long-term memory (Kim, 2009; Browne and Parsons, 2012). Short-term memory is characterized by its limited amount of information and its short decay period (Atkinson and Shiffrin, 1968; Cowan, 2008). On the contrary, long-term memory is defined as *"a vast store of knowledge and a record of prior events"* (Cowan, 2008, p. 3). Long-term memory is again divided into explicit and implicit memory (Miller and Cohen, 2001; Winn and Snyder, 2004). Explicit memory is characterized as explicit and conscious, because the memories can be transferred into the short-term memory such that individuals are able to explicitly declare their memories as thoughts and beliefs. Explicit memory includes sematic memories, which are more like knowledge about the world such as facts and concepts, and episodic memories, which are related to personal events and experiences. In contrast to that, implicit memories cannot be consciously processed, because these cannot be transferred into short-term memory. Based on these facts

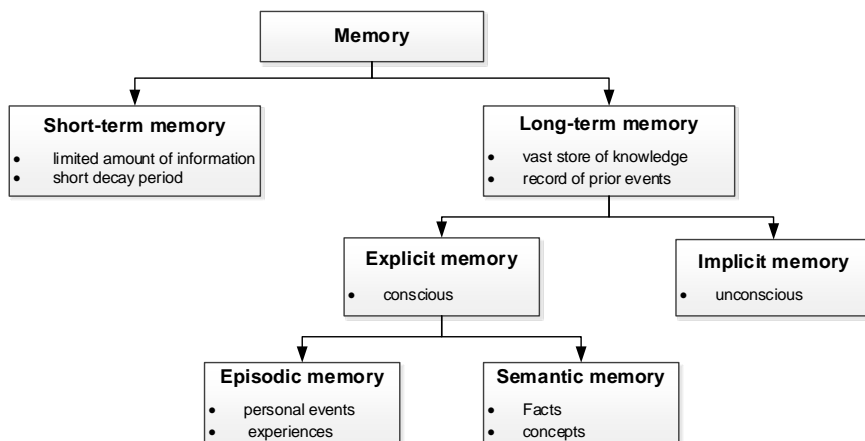individuals are not able to consciously identify and declare the contents of implicit memory (Kim, 2009).

Figure 1.   Memory tree

2.2   Explicit and implicit attitudes

Psychological literature distinguishes explicit and implicit attitudes (Greenwald and Banaji, 1995; Rudman, 2004). Explicit attitudes represent the favorable or unfavorable disposition towards some stimulus objects such as people, places, or things (Fishbein and Ajzen, 1975; Greenwald and Banaji, 1995). Explicit attitudes are characterized by a conscious awareness of the attitude during the corresponding action or during self-reports (Myers and Twenge, 2013). This type of attitude is explicit, because after perceiving the attitudes they are stored in the explicit memory (see Figure 1) and the attitudes can be transferred from the long-term memory to the short-term memory, which enables individuals to explicitly declare their attitude after a few days or even a lifetime (e.g., Kim, 2009).

On the contrary, implicit attitudes are *"introspectively unidentified (or inaccurately identified) traces of past experience that mediates favorable or unfavorable feeling, thought, or action towards social objects"* (Greenwald and Banaji, 1995, p. 8). In other words, implicit attitudes are based on past, maybe even forgotten experiences and are automatic associations individuals make between a stimulus object and its favorable or unfavorable evaluation (Rudman, 2004). These implicit attitudes are characterized by an unconscious awareness about the favorable or unfavorable feelings towards the stimulus object, such that individuals may not be consciously aware of the origin of their attitude, the attitude itself, or its consequences on other actions (Gawronski *et al.*, 2006). These characteristics lead to the fact that implicit attitudes cannot be remembered in the usual sense and therefore, they are unavailable when trying to report them in survey or introspection (Greenwald and Banaji, 1995). Individuals' attitudes are stored in implicit memory (see Figure 1) and can never be transferred to short-term memory, such that individuals are not able to consciously identify an attitude towards the stimulus object.

In sum, attitudes can be distinguished into explicit and implicit attitudes. Explicit attitudes are conscious dispositions towards the stimulus object. They are stored in the explicit memory and can be transferred into the short-term memory, such that individuals can explicitly declare their attitude even after a long period, whereas implicit attitudes are unconscious dispositions towards the stimulus objects. These attitudes are stored in the implicit memory and cannot be transferred into the short-term memory, such that individuals are not able to declare the implicit attitudes in a survey (Greenwald and Banaji, 1995).

2.3   The role of attitudes in IS acceptance and usage literature

One major objective of IS research is to predict and explain the IS usage intention and behavior. Based on the theory of reasoned action (TRA; Fishbein and Ajzen, 1975) and the theory of planned behavior (TPB; Ajzen, 1991) the TAM (Davis *et al.*, 1989) was developed and extended (Taylor and Todd, 1995; Venkatesh and Davis, 2000; Venkatesh *et al.*, 2003; Venkatesh *et al.*, 2012). Regarding attitudes, all models indicate a similar structure. The endogenous variable is mostly the usage behavior, which is influenced by behavioral intentions, as suggested in the TPB and TRA. Behavioral intention is influenced by several latent variables such as attitudes or subjective norms, whereby attitudes are mostly influenced by beliefs about the stimulus object. Attitudes are one of three most important determination factors of behavioral intentions, such that the present research-in-progress considers the attitude object more precisely by differentiating attitudes in explicit and implicit attitudes. Over the last 25 years the TAM constructs such as attitudes have typically been measured with subjective survey scales (Dimoka and Davis, 2008), but implicit attitudes cannot be captured with questionnaires. Besides theses studies, which use perceptual and self-reported measures, there are some investigations, which draw on other measurement techniques. Dimoka and Davis (2008) conduct a functional magnetic resonance imaging (fMRI) study, which uncovers the neural mechanisms that underlie users' technology adoption behavior. They localize the neural correlates of the TAM constructs and uncover hidden processes associated with intentions to use. In addition, the research also reveals certain technological antecedents of the TAM constructs. Ortiz de Guinea et al. (2014) investigate explicit and implicit antecedents of cognitive beliefs, which are according to the TAM antecedents of explicit attitudes, by drawing on neurological measures such as electroencephalography (EEG). The results indicate that implicit and explicit antecedents work together and have a nonlinear effect on behavioral beliefs.

In sum, the IS adoption literature indicates that beliefs and attitudes determine the behavioral intention towards an IS, which in turn leads to usage. Regarding attitudes, prior IS literature indicates that most of the literature has focused on explicit attitudes, which are consciously and cognitively available for self-reports (Dimoka and Davis, 2008). Some investigations use different measurement techniques such as fMRI or EEG but also do not consider implicit attitudes nor differentiate them from explicit attitudes. In other words, implicit attitudes are not taken into consideration in IS research, but they might be needed to understand intentional behaviour, because attitude is a dual system (Wilson *et al.*, 2000). Hence, the present research-in-progress paper aims to identify an individual's implicit attitudes towards an IS and to analyze the influence these attitudes have on behavioral intentions.

3   Hypotheses Development

Psychological literature claims that attitudes can be explicit and implicit (Greenwald and Banaji, 1995). Explicit attitudes are characterized by the conscious awareness of the attitude, whereas implicit attitudes are unconscious and involuntary dispositions towards the stimulus objects (Greenwald and Banaji, 1995; Gawronski *et al.*, 2006). IS literature states that explicit attitudes are one of the three most important determination factors on behavioral intention (Jeyaraj *et al.*, 2006), whereas psychological literature states that implicit attitudes also influence behavioral intentions (Devos, 2008). Therefore, we first hypothesize that explicit attitudes have an influence on behavioral intentions. Second, we assume that behavioral intentions are influenced by implicit attitudes, as well.

The prominent TAM proposes that the attitude influences the behavioral intention towards an IS positively. Most of the adoption research considers only the explicit attitude towards using the IS by utilizing self-reported measurements such as questionnaires (e.g., Davis *et al.*, 1989; Taylor and Todd, 1995; Yang and Yoo, 2004), which automatically excluded the observation of implicit attitudes, which are not measurable with questionnaires (Greenwald and Banaji, 1995). Literature states that individuals form a behavioral intention when they can declare a positive and explicit attitude towards a stimu-

lus object such as the behavior (Davis *et al.*, 1989). Consequently, regarding the adoption literature, the relationship between the explicit attitudes and behavioral intentions is well established (Williams *et al.*, 2009), such that we assume:

H1: The higher the explicit attitude towards using the IS, the higher the behavioral intention towards using the IS.

Implicit attitudes are favorable or unfavorable feelings towards a stimulus object, which are stored in the implicit memory and are therefore unconscious, such that individuals are unable to declare this kind of attitude (Greenwald and Banaji, 1995; Rudman, 2004; Gawronski *et al.*, 2006). Implicit memories are also associated with actions required to perform a task and might also influence technology usage (Kim, 2009). Devos (2008, p. 75) states that *"evaluations operating outside of conscious awareness or control result in behavioral tendencies"*. The automatic and implicit categorization of the stimulus object as either favorable or unfavorable has a direct influence on the behavior, because this automatic process evokes thought, feelings and leads to actions (Greenwald and Banaji, 1995; Chen and Bargh, 1999). Hence, we assume that:

H2: The higher the implicit attitude towards using the IS, the higher the behavioral intention towards using the IS.

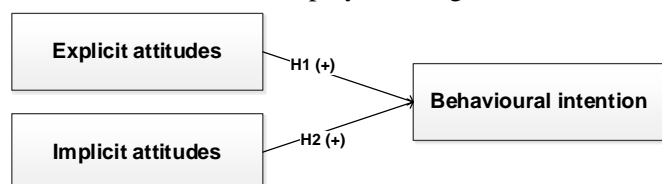The research model is displayed in Figure 2.

Figure 2.   Research model

4   Methodology

In the methodology section, we first introduce the implicit association test, which is used to measure implicit attitudes. Afterwards, we describe the experimental design and the measurement used in the study to measure, among others, explicit attitudes and behavioral intentions.

4.1   Implicit association test

In order to investigate implicit attitudes, we draw on an indirect measurement method called Implicit Association Test (IAT). The IAT has been developed by Greenwald et al. (1998) to capture implicit attitudes, by measuring their underlying automatic associations between various stimulus objects and various evaluative attributes (Greenwald *et al.*, 1998). The test measures the association between the target-concept discrimination and the evaluative attribute and assumes that the higher the association between the target-concept and attribute is, the stronger the implicit attitude (Karpinski and Hilton, 2001). The IAT is a computer-based test, which captures the response time of the participants. According to Greenwald et al. (1998), the IAT encompasses five sequences in which stimuli have to assign to different categories. The test includes a pair of target-concepts such as two technologies and an attribute dimension such as pleasant vs. unpleasant. Participants have to assign stimuli, which either correspond to one of the target-concepts or to one attribute dimension. The target-concepts and attributes are presented at the left and right upper corners of the computer screen (see Figure 3). During the test the classification between the target-concepts and the attribute dimension changes such that for example the stimuli have to be either assigned to target-concept one and attribute one (e.g., Facebook and pleasant) or to target-concept two and attribute two (e.g., SAP and unpleasant; see Figure 3). Afterwards the response assignment for the target-concept discriminations is reversed, such that the left response is now right and the right response is now left. In this step stimuli have to be either assigned to

target-concept two and attribute one (e.g., SAP and pleasant) or to target-concept one and attribute two (e.g., Facebook and unpleasant). If the target-concepts are differentially associated with the attribute dimension, the subject should find one of the combined easier than the other, which will be analyzed by computing the response time from the appearance of the stimuli to the response of the individual: the shorter the response time in the greater the association between the target-concept and the attribute (Karpinski and Hilton, 2001).

4.2 Experimental design

The experiment follows a 2x2 within-subject design with the factors technology (Facebook, SAP) and pleasantness (pleasant, unpleasant). Extrapolated from the design, the experiment comprises four different treatment conditions. To investigate the influence of implicit attitudes on behavioral intentions we draw on the above described IAT. In the following, we first describe the overall experimental procedure. Afterwards we demonstrate the material and apparatus, which is needed for the experiment and lastly, the IAT procedure is described.

4.2.1 Experimental procedure

The procedure of the experiment is classified into the stages: pre-experimental, experimental and post-experimental stage. In the **pre-experimental stage** the subject arrives at the laboratory and is welcomed to the experiment. Following to that, the facilitator guides the subject to the work place in our laboratory. Subsequently, the **experimental stage** begins, in which the subject participates in the IAT, which captures the response time for all four conditions in order to measure the implicit attitudes. After finishing the IAT the **post-experimental stage** begins, in which the subject fulfills the second questionnaire, which among others contains questions to capture the explicit attitude towards the technologies.

4.2.2 Material and apparatus

To conduct the IAT in an experimental setting we need two different target-concepts and hence distinguish between hedonistic and utilitarian ISs (van der Heijden, 2004), because the predictive validity of the attitude on behavioral intention differs between the two types of ISs (Krönung and Eckhardt, 2011). We focus on Facebook as a hedonistic IS because of is wide dissemination and because it has been investigated in prior experimental settings (Maier *et al.*, 2014; Maier *et al.*, 2015). Furthermore, we focus on SAP as a utilitarian IS because SAP is one of the largest providers of enterprise resource planning system. The IAT needs sample stimuli, which will be adjusted to the target-concepts as well as the attributes. In the experiment, the IAT task will use 100 stimuli words and pictures: 25 stimuli regarding Facebook, 25 stimuli regarding SAP, 25 pleasant-meaning words and 25 unpleasant-meaning words. The stimuli regarding the technologies will be screenshots of the technology as well as stimulus words, which will be identified in a pre-study. The pleasant- and unpleasant-meaning words are selected from Greenwald et al. (1998). The ITA will be conducted by using an online-based IAT provided by Socialsci © (www. https://research.socialsci.com).

4.2.3 The IAT procedure

The experiment aims to investigate the implicit attitude towards Facebook as well as SAP such that the experience contains two target-concepts: Facebook (e.g., time line, post, like, friends) and SAP (e.g., ERP, ABAP, MM, MRP II). A second propose of the study is to analyze the implicit attitude of the two target-concepts, such that the following two attribute dimensions have to be evaluated: pleasant (e.g., family, happy, peace) and unpleasant (e.g., crash, rotten, ugly). Each target-concept discrimination is used in combination with discrimination of pleasant-meaning words and unpleasant-meaning word. The IAT procedure is expected to reveal superior performance for one of the combinations that

are evaluative compatible (Facebook + pleasant or SAP + unpleasant) or (Facebook + unpleasant or SAP + pleasant).

Steps	Step 1	Step 2	Step 3	Step 4	Step 5
Task description	**Initial target-concept discrimination**	**Associated attribute discrimination**	**Initial combined task**	**Reversed target-concept discrimination**	**Reversed combined task**
Task instructions	(L) FACEBOOK SAP (R)	(L) pleasant unpleasant (R)	(L) FACEBOOK (L) pleasant SAP (R) unpleasant (R)	FACEBOOK (R) (L) SAP	FACEBOOK (R) (L) SAP (L) pleasant unpleasant (R)
Sample stimuli	ERP (R) (L) TIME LINE (L) POST ABAP (R) (L) LIKE MM (R) MRP II (R) (L) FRIENDS	(L) lucky (L) honor poison (R) grief (R) (L) gift disaster (R) (L) happy hatred (R)	(L) TIME LINE (L) pleasure ERP (R) evil (R) ABAP (R) (L) miracle (L) POST bomb (R)	(L) ERP (L) ABAP TIME LINE (R) (L) MM POST (R) LIKE (R) (L) MRP II (R) FRIENDS (R)	(L) peace ERP (R) filth (R) (L) TIME LINE (L) rainbow POST (R) accident (R) (L) MRP II
Note: (L) = left response, (R) = right response					

Table 1: *Schematic description and illustration of the IAT procedure (adopted from Greenwald et al., 1998)*

The IAT procedure consists of five steps, which are summarized in Table 1. In **step one,** the subjects are familiarized with the discrimination task for the two categories, each of which contains 25 trails. Each step starts with instructions that describe the category discriminations for the step and the assignments of response keys (left or right) to categories. This is followed by a task in which a sample stimulus is presented at the center of the display and the two category-label words (Facebook and SAP) are presented at the left and right upper corners of the screen (see Figure 3 left). Subjects are asked to assess whether the sample stimuli belong to the left or the right category. Thereby they are forced to response as quickly and accurately as possible by pressing one of two designated keys on the keyboard (the E and I keys). A red cross is delivered as feedback when an incorrect response is offered. **Step two** follows a similar procedure, subjects discriminate between the two attributes pleasant and unpleasant, each of which encompasses 25 trials. As previously describe, subjects assess whether the sample stimuli belongs to one of the categories by pressing one of two designated keys. **Step three** consists of 50 critical trials in which participants categorize a sample stimuli into two combined categories, each of which include concepts that has been assigned to the same key. These steps operated as if subjects were engaging in step one and two concurrently. For example, during a trial within step three, two labels appeared on each side: ''Facebook'' and ''pleasant'' appeared on the left and ''SAP'' and ''unpleasant'' appeared on the right. A sample stimulus out of one of those two categories is presented at the center of the display (see Figure 3). Subjects discriminated between the sample stimuli according to these labels. In **step four,** the key assignment for the target-concept is reversed such that "Facebook" is now presented at the right upper corner and "SAP" at the left upper corner of the screen. Despite the reversed key assignment, the step operates as if subjects are engaging in step one. **Step five** operates as if subjects are engaging in step three with the exception that the key assignment is reversed. Afterwards, the IAT is over and the post-experimental stage begins, in which the subjects have to fulfill a second questionnaire.
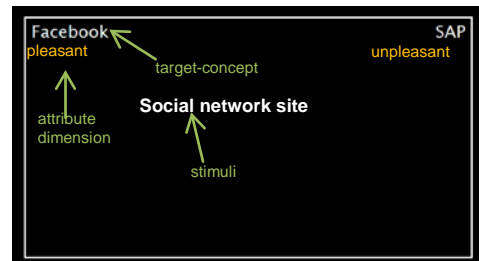

Figure 3. *(left) IAT step one: assessing the stimuli to one of the two target-concepts (Facebook, SAP); (right) IAT step 3: either assessing the stimuli to the combination 1 (Facebook, pleasant) or to the combination 2 (SAP, unpleasant).*

4.3 Measurement

In the pre-experimental stage demographic data of the participants such as age, gender, social status etc. is measured by a paper-based questionnaire. In addition, the subjects have to report if they have already used one of the two technologies. In the experimental stage, the IAT records the reaction times in milliseconds from the onset of the task display to the response. The reaction time of all five steps is captured through the IAT. For analyzing the implicit attitude we draw on the D-score algorithm for IAT data based on Greenwald et al. (2003), which compares the response times of the different steps and calculates a D-score that represents the implicit attitude. In the post-experimental stage we measure the explicit attitude towards Facebook and SAP by drawing on the existing and valid attitude scale provides by Davis et al. (1989). Furthermore, we capture the behavioral intention towards Facebook and SAP by adopting the questions based on Davis et al. (1989) and adjust them for our purposes. Besides the demographics and control variables, the explicit attitude towards using the IS and the behavioral intention towards Facebook and SAP are collected by an online questionnaire.

5 Next Steps and Expected Contributions

Prior IS research states that attitudes are one of the three most considered independent variables in order to explain behavioral intention (Jeyaraj *et al.*, 2006) and several authors call for a greater consideration of attitudes in the IS discipline (Yang and Yoo, 2004; Zhang *et al.*, 2008). To address this shortcoming, the present research-in-progress paper draws on the memory model (Kim, 2009) to introduce the concept of implicit attitudes into IS adoption research and hypothesizes the influence of explicit and implicit attitudes on behavioral intentions towards IS usage. Furthermore, based on the IAT and surveys, we propose an experimental setting, which obtains explicit and implicit data to validate the proposed research model. The next steps in this research are to conduct the proposed experiment by implementing the IAT and recruit subjects for the experiment. Regarding the recruitment, we are distinguishing between users, which currently use the target-concepts (Facebook and SAP), and non-users, which know the target-concepts but have no account for using the technologies.

The proposed research will contribute to literature as follows. Prior literature in the research stream of IS acceptance and usage mostly focuses on explicit attitudes (e.g., Davis *et al.*, 1989; Venkatesh *et al.*, 2003; Venkatesh *et al.*, 2012). The proposed research contributes to this research stream by focusing not only on explicit attitudes but also on implicit attitudes, which are unconscious and which individuals are unable to express. In addition, by distinguishing attitudes into explicit and implicit attitudes and hypothesizing their influences on the behavioral intention towards IS usage, we expect to extend IS acceptance and usage literature (e.g., Davis *et al.*, 1989; Venkatesh *et al.*, 2003; Venkatesh *et al.*, 2012) by better predicting behavioral intentions towards using the IS, because the dual system of attitude state that different evaluation of the same attitude object can exists (Wilson *et al.*, 2000), which both influence behavior. Furthermore, by neglecting implicit attitudes and only considering explicit attitudes towards an IS the results might be distorted, such that the present research might contribute to a new upcoming research stream on distorted beliefs, intentions and behavior (e.g., Turel *et al.*, 2011; Polites and Karahanna, 2012). Furthermore, the proposed research aims to reduce the intention-behavior gap (Bhattacherjee and Sanford, 2009) by considering implicit attitudes next to explicit attitudes for a better prediction of behavior. As we introduced the IAT in IS research in order to measure unconscious associations in the implicit long-term memory, we contribute to a greater diversity of methods in IS literature and propose a suitable method to measure implicit and unconscious attitudes, which might be used in further research.

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