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ON THE COGNITIVE-AFFECTIVE STRUCTURE
OF ATTITUDES TOWARD INFORMATION SYSTEMS

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Abstract

Social psychologists have long recognized that attitudes are formed through a combination of cognitive appraisals (i.e., evaluations based on beliefs) and affective appraisals (i.e., evaluations based on feelings, emotions, and gut reactions). However, the dominant perspective for explaining user attitudes toward information systems is still cognition-based. In this research, we study the cognitive and affective composition of user attitudes, and the way this composition is influenced by individual differences and system design differences.

This research aims to make three contributions. First, we strengthen the current understanding of IS attitudes with new empirical findings on the relative role of affect and cognition. Second, we aim to demonstrate how the features of an information system evoke different compositions of affective and cognitive attitudes. Third, we expect to demonstrate how gender and experience influence cognitive-affective structures, even when controlling for system features.

1   BACKGROUND AND MOTIVATION

In information systems (IS) research, the dominant perspective to explain user attitudes toward information systems is cognition-based. For example, the rationale put forward by the well known technology acceptance model (TAM) (Davis 1989) is squarely rooted in the theory of reasoned action (TRA). This socio-psychological theory hypothesizes that attitudes are formed through a cognitive appraisal of beliefs (Fishbein and Ajzen 1975). IS researchers have made good progress in the identification of cognitive drivers salient to the evaluation of information systems. For example, the TAM constructs perceived usefulness and perceived ease of use are now established parts of the body of knowledge in IS research.

These achievements notwithstanding, researchers in social psychology have long recognized that attitudes are formed through a combination of cognitive appraisals (i.e., evaluations based on beliefs) and *affective* appraisals (i.e., evaluations based on feelings, emotions, and gut reactions). Furthermore, a growing stream of research in this discipline is based on the *affect primacy* hypothesis. This hypothesis states that affective appraisals come earlier to the human brain than cognitive appraisals, and that persons will evaluate an object even without cognitive stimuli (Zajonc 1980). Neuro-psychological evidence supports affect primacy (LeDoux 1995), leading some psychologists to infer that cognitive evaluation in the brain primarily serves to moderate the affective evaluation. While the famous affect primacy hypothesis is not shared by everyone, the role of affect in attitude formation is nevertheless undisputed. As a testimony of this, affect receives growing recognition from TRA researchers. In line with their conceptualization, we reserve the term affect for "general moods (happiness, sadness) and specific emotions (fear, anger, envy)" (Ajzen, 2001, p. 29).

The growing recognition of affect by social-psychologists has not been paralleled by an increased interest in affect in information systems research. Research on computer anxiety aside, studies of affect toward computers and information systems are relatively few in number. Three theoretical perspectives have been used predominantly: the *motivational* perspective as put forward by motivational theorists (Davis et al. 1992), the *Triandis* perspective (Thompson et al. 1991), and the *social cognitive* perspective (Compeau et al. 1999). Unfortunately, the empirical results of these studies are somewhat discouraging. Typically, there is (1) a

high degree of multi-collinearity between cognitive and affective drivers (this is supported by the theory that people tend to co-align their feelings with their thoughts over time) and (2) a relatively modest influence of affect on people's intention to use computers—if at all.

These findings give rise to a number of important questions regarding the role of affect in the formation of user attitudes. Under what conditions could affect take precedence over cognition? Does this depend on the information system being used, and if so, how? Does it depend on the individual user, and if so, how? The research described in this paper aims to address these questions.

Specifically, our research objectives are threefold. First, we partially replicate several studies on IS affect and cognition. Second, we extend these studies by taking into account the nature of the information system, and how differences in system design evoke different combinations of affective and cognitive attitude structures. Third, we extend previous research by examining the role of gender and experience in greater detail.

2   HYPOTHESES

The relative importance of cognitive versus affective components in the determination of an attitude depends on characteristics of the attitude object. Objects that carry instrumental characteristics evoke more cognitive responses, whereas those that carry less instrumental characteristics evoke more affective responses (Ajzen 2001). Empirical research in consumer behavior has long demonstrated this effect for consumer products. *Hedonic* is the term often used for products that have no instrumental value, whereas the term *utilitarian* is used for products that have functional value (Hirschman and Holbrook 1982). Particularly noteworthy is the recent study by Kempf (1999), who demonstrated that evaluation of functional software (a grammar checker) is based on cognition whereas evaluation of hedonic software (a computer game) is based on affect.

It is not controversial to argue that most information systems *in the workplace* are designed to be utilitarian. This is one explanation why previous research detected little influence of the role of affect in the evaluation of these systems. However, there are many computer applications that are uncompromisingly hedonic—computer games being the most prominent example. One should be cautious, however, to characterize information systems as either purely utilitarian (e.g., office information systems) or purely hedonic (e.g., games). Practice suggests that many information systems are developed to provide both utilitarian and hedonic value. It depends on the system *features* that are implemented. For this reason, we introduce the term *utilitarian features* to represent those features that are implemented to perform a task more effectively. In contrast, *hedonic features* are features that are implemented to serve no particular useful purpose at all. They are implemented "just" for the fun of using them. In the feature-based perspective, a single information system may evoke different attitudinal structures, depending on the feature that is being used.

In line with the findings from social psychology and consumer behavior, it is likely that the affective component has a reasonable chance to manifest itself in the attitude toward using hedonic features. Because of this, we arrive at the following hypotheses.

> *Hypothesis 1: Users demonstrate affective rather than cognitive bases for their intention to use hedonic system features*

> *Hypothesis 2: Users demonstrate cognitive rather than affective bases for their intention to use utilitarian system features*

The relative importance of cognition versus affect in the determination of an attitude depends not only on the characteristics of the attitudinal object, but also on the characteristics of the individual (Ajzen 2001). Irrespective of the object that is evaluated, people vary in their disposition toward more cognitive or more affective evaluation (Haddock and Zanna 1998). In this regard, the discriminating role of gender has been the subject of much discussion. Previous research in management information systems provides evidence that gender does play this role in explaining perceptions toward information systems. For example, men's usage intentions are more strongly influenced by perceptions of usefulness than women's (Venkatesh and Morris 2000). Whether women's usage intentions are more strongly influenced by affective appraisals remains an open issue. It is, therefore, appropriate to examine whether gender influences the relationship between evaluation bases (both cognitive and affective) and the intent to use certain system features.

Another important moderator for the relationships between attitudes and intentions is experience. Earlier studies in technology acceptance have consistently shown that experience with computers alleviates the impact of cognitive and affective evaluations on usage intentions (Venkatesh and Davis 2000). For this reason, we hypothesize that:

Hypothesis 3: The relationship between affect and intention to use is moderated by gender and experience.

Hypothesis 4: The relationship between cognition and intention to use is moderated by gender and experience.

Based on earlier models that have appeared in the literature, a structural model has been developed that puts the constructs developed in this section into a nomological net. This model, shown in Figure 1 can be estimated using structural equation modeling (SEM). The results of this estimation (in particular the effect sizes) are used to test the hypotheses.
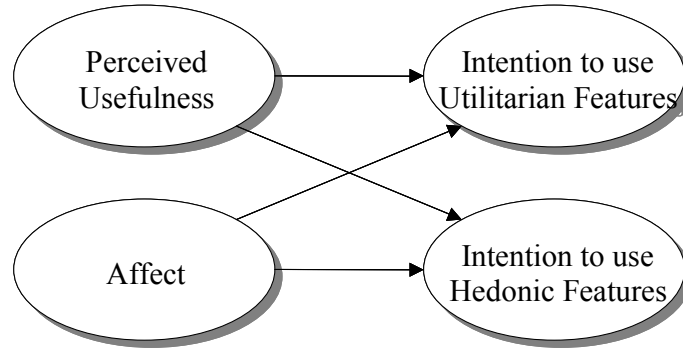

Figure 1. The Role of Cognition and Affect

2.1 Empirical Setting

In line with our hypotheses, the information system to be used in our empirical study should at least contain hedonic features. Because this criterium rules out most office information systems, we decided to select a publicly accessible Internet Website. To preserve the linkage with existing research on information systems, the Website had to meet two additional requirements. It had to (1) function *solely* as an information system (i.e., the purpose of the Website should be to provide output information based on input from a user), and (2) provide the information *for free*. Price is likely to influence cognitive and affective appraisals severely, and this influence does not generally occur in the case of an end user of "traditional" information systems.

After consideration of a number of Websites, we selected a Website that provides information on movies. The site provides information on new movies and on the daily agendas of movie theaters in large cities. These features are utilitarian because this information is consumed by users as a means for more informed decision making on which movies to go and see (of course, going to the movies is *in itself* a hedonic activity). Additionally, the Website gives the latest information about movie stars (under the heading "gossip"), and provides opportunities for downloading ringtones and designing mobile phone logos. These features are hedonic because this information is generally consumed *as is*.

2.1 Measures

The cognitive measures used for this study are perceived usefulness and perceived ease of use, taken from the recently updated TAM model (Venkatesh and Davis 2000). Affect is measured using a measure from (Compeau et al. 1999), supplemented with five semantic differentials on feelings associated with the use of the system. Intention to use is again taken from the TAM model.

Because the Website is in Dutch, conversion of the measurement scales into the Dutch language was deemed required. Of course, this introduces the risk of language bias. To control for this, we conducted a double back translation of the measures. First, the items were translated into Dutch by the author. This translation was then reviewed by a Dutch colleague outside the IS field. The resulting questionnaire was then translated *back into English* by an independent translator who was not aware of the original instruments. Finally, a native English speaker (U.S. origin) verified the original translation with the back translation and evaluated whether each item conveyed the same meaning. This procedure is to be repeated if major inconsistencies are found, but no inconsistencies came up in the present study.

2.3 Progress to Date

The empirical part of the research project was completed shortly after the ICIS deadline. The survey has been translated and back translated, and the resulting questionnaire has been subject to a pretest with seven faculty members. The researchers were granted access to the user database of the movie site and obtained permission to conduct a survey among the users. We selected a random sample of 5,500 users out of a registered user database of 14,920 users. These users were e-mailed with an invitation to participate in the study, together with a link to an electronic version of the survey. Incentives to participate were arranged by the company owning the Website and included the chance to win free movie tickets. The survey was launched on May 8, 2002, 14.22 hours.

3 EXPECTED CONTRIBUTIONS

The contributions of this research project are threefold. First, we aim to strengthen the current understanding of IS attitudes with new empirical findings on the relative role of affect and cognition. In doing so, we clarify the role of affect in the formation of user attitudes. Second, we demonstrate how the design features of an information system evoke different compositions of the affective and the cognitive elements of user attitudes. Third, we demonstrate how gender and experience influence the intent to use hedonic versus utilitarian features of an information systems.

At the heart of our research is the hypothesis that users are not always mindful in forming their attitudes toward information systems. We have aimed to clarify the conditions under which they are "mindless," i.e., primarily based on affective appraisals. We believe our results will have practical significance and will also open up interesting areas for further academic research.

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