CHAPTER 14

THE ROLE OF AFFECT IN INFORMATION SYSTEMS RESEARCH

A Critical Survey and a Research Model

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Abstract: *Most existing models or theories in IS focus on the cognitive and behavioral aspects of human decision-making processes and on individual reactions to using technologies in organizations and other contexts. The influence of affect or emotion is traditionally neglected. The affective aspect, however, is considered crucial, and has gained attention in psychology, marketing, organizational behavior, and other fields. Recently, affect and related concepts have attracted attention from researchers in information systems (IS) and human-computer interaction (HCI). Yet, studies of affect have been scattered and less systematic. This paper first examines the theoretical advancement of affect studies in several referencing disciplines to IS: psychology, organizational psychology, and marketing and consumer behavior. An abstract model of the individual interacting with an object (IIO) is developed to represent the important contributors to behavior intention and behavior of people interacting with objects. Then the chapter continues with a comprehensive survey of existing studies on affect in the IS discipline to demonstrate the current status of the research stream, some conceptual discrepancies and limitations, and some potential areas for future research. An IT-specific model of IIO, a model of individual interaction with IT (IIIT), is constructed as both a framework and a theoretical model to interpret and predict individual IT user behavior. This study is an attempt to highlight and systematically analyze the influence of affect in IS and therefore has great implications for both researchers and practitioners.*

Key words: *Affect, Emotion, Cognition, Information Systems, Personality Trait, Affective Reactions Toward Using IT, Cognitive Reactions Toward Using IT*

INTRODUCTION

Affect, a general word for several related but different concepts, normally refers to mood, emotion, and feelings (Russell, 2003). Affect is conceived as an umbrella for a set of more specific mental processes including emotions, moods, and attitudes (Bagozzi et al., 1999; Liljander and Mattsson, 2002). It is noteworthy that affect is too broad a class of events to be a single scientific category (Russell and Barrett, 1999). Affect's boundary is so blurry that it keeps being the most mysterious aspect of the psychology of human beings (Russell, 2003). Despite this, research on affect is of great interest to researchers in fields such as psychology, marketing and customer research, and organizational behavior, due to continuously recognized important impacts that affect has on people's everyday social judgments (Forgas, 1995).

In the information systems (IS) and human-computer interaction (HCI) fields, however, affect has historically received little attention. Most existing theories and models focus on cognitive aspects of human beings, presuming that users must discard their affective selves to work efficiently and rationally with computers (Brave and Nass, 2002). Affective factors seem at best marginally relevant to human-computer interaction and at worst oxymoronic (Brave and Nass, 2002). Studies on psychology, marketing and consumer research, and organizational behavior research, however, suggest that affect can help in explaining a significant amount of variance in users' behavior.

The advantages of studying affect are not limited to this. Affect has several features, some of which are somehow different from what we would expect them to be. For example, people often exhibit greater commonality in affective reactions toward stimuli than in the reason-based or cognitive assessments (Pham et al., 2001); knowing this is of great practical value (e.g., for systems design). It contradicts the widespread assumptions that affective judgments are inherently subjective and contextually labile, hence unreliable, and that cognitive, or reason-based judgments are more objective, which makes them a more dependable source of evaluative information. Pham et al. (2001) attributed the higher interpersonal consistency of affective feelings to the broad applicability and inherent stability of universal affective sensory-motor programs and culturally shared emotional schemata. Cognition, by comparison, leaves more room for idiosyncrasy. More importantly, affect can have more explanatory power than cognition does under certain circumstances, which is of great interest to both researchers and practitioners (Pham et al., 2001).

Affect's definitions vary in prior studies in IS field. It has been viewed as a personal trait (Agarwal and Karahanna, 2000; Webster and Martocchio, 1992; Yager et al., 1997), as a state (Venkatesh, 1999; Webster et al., 1993), as antecedent of cognition (Venkatesh, 2000), as consequence of cognition (Compeau et al., 1999), and as a positive thing (Csikszentmihalyi, 2000; Novak et al., 2003) or a negative thing (Compeau et al., 1999; i.e., Hackbarth et al., 2003; Thatcher and Perrewe, 2002). Together, these studies seem a bit confusing and less than comprehensive. So it is necessary to examine different views and roles of affect in IS research.

One of the motivations of this research lies in the inconsistent results of attitude, a concept closely related to affect, in prior IS empirical studies. A good example is the technology acceptance model (TAM) (Davis, 1989; Davis et al., 1989), which is viewed as the most well-known model of individual reactions towards technologies (Taylor and Todd, 1995). Attitude was hypothesized to be a predictor of users' behavioral intention towards using new technologies or actual usage of them, and is also the only affect-related factor in TAM. But attitude was omitted from the original TAM due to its weak mediating effects on the relationship between perceived usefulness and behavioral intention (Davis et al., 1989). Mixed results have been demonstrated by a number of TAM-related studies (Sun and Zhang, 2006). Triandis (1980) argued for the separation of the affective (which has a like/dislike connotation) and cognitive components of attitude. Triandis subsequently introduced the term "affect," defined as "the feelings of joy, elation, or pleasure, or depression, disgust, displeasure, or hate associated by an individual with a particular act" (Triandis, 1980). This study is, therefore, an attempt to examine and identify the major issues pertaining to affective concepts as well as their relationships to other related concepts.

This study started with an examination of the research on affective concepts in several reference disciplines of IS. Then, an abstract model of an individual interacting with an object (IIO) was developed based on this examination. The IIO model was then used as guidance to scrutinize affect-related studies in IS. A set of IT-specific affective concepts is identified, and their relationships to other factors are crystallized, resulting in a model of individuals' interaction with IT (IIIT) that can explain existing affect-related studies and guide future investigations and systems development practice.

THEORETICAL GROUNDS AND AN ABSTRACT MODEL

This section starts with a review of the basic concepts and relationships of affect that have been studied in three reference disciplines of IS: psychology, marketing and consumer research, and organizational and social psychology. Based on findings in these three fields, an abstract model of an individual interacting with stimuli is proposed, which provides a ground for further discussions of affect studies in IS.

Theoretical Background

Table 14.1 summarizes the important concepts to be introduced in this section and used in the rest of the paper. These concepts will be discussed in detail later.

Affect, Core Affect, Emotion, and Mood

Psychology has provided major theoretical bases for research on affect. In this field, affect-related concepts such as emotion and mood have been studied for a long time and continue to be a focal research area (Remington et al., 2000). For example, an examination of articles published between 1991 and 1997 in the *Journal of Personality and Social Psychology*, a primary psychology journal, shows a total of 359 (30 percent) articles in which emotion was assessed (Russell and Barrett, 1999). Recently, the concept of affect has been further analyzed and clarified (e.g., Russell, 2003), which greatly promotes the usability of this concept in other fields.

Basically, the structure of affect includes two independent dimensions, valence and arousal, which are also called the "big two" of affect (Yik and Russell, 2001). The circumplex model of affect was created by Schosberg (1952, 1941) and subsequently most extensively elaborated by Russell (1980). It is one of the most widely studied models (Remington et al., 2000). Figure 14.1 shows the two dimensions of affect. The horizontal dimension is pleasure-displeasure (or valence), ranging from one extreme (e.g., agony) to the other extreme (e.g., ecstasy) and the vertical dimension is arousal (or activation), ranging from sleepiness to excitement (Russell, 2003).

Recently, affect has been further clarified, and core affect was identified as a primitive concept upon which all other affective concepts, including emotions, are built (Russell, 2003; Russell and Barrett, 1999). Core affect is a continuous assessment of one's current state. Core affect is object free (free-floating) and depicts the affective state using valence and arousal (Russell, 2003).

Affective reaction toward interacting with an object is a person's subjective perception or judgment about whether such interaction will change his or her core affect or his or her emotion toward the object.

Cognitive reaction toward interacting with the object involves cognitive reasoning, or appraisal, and is a weighting of the implications of an event for one's well-being. Cognitive reaction and affective reaction to interacting with an object can be quite different: one might understand taking a medicine as useful and necessary for one's health; nevertheless, one can at the same time consider it unpleasant due to its smell and taste.

Another commonly seen concept and term is mood. Usually the concepts of emotion and mood are distinguished from each other by one of three criteria: duration, intensity, and diffuseness or globality (Frijda, 1993). In general, emotions have shorter duration and higher intensity than moods. Of more interest, emotion is usually toward a particular object or objects, while mood provides a "background." Specifically, emotions are intentional phenomena and usually involve a subject-object

Table 14.1

A Summary of General Concepts

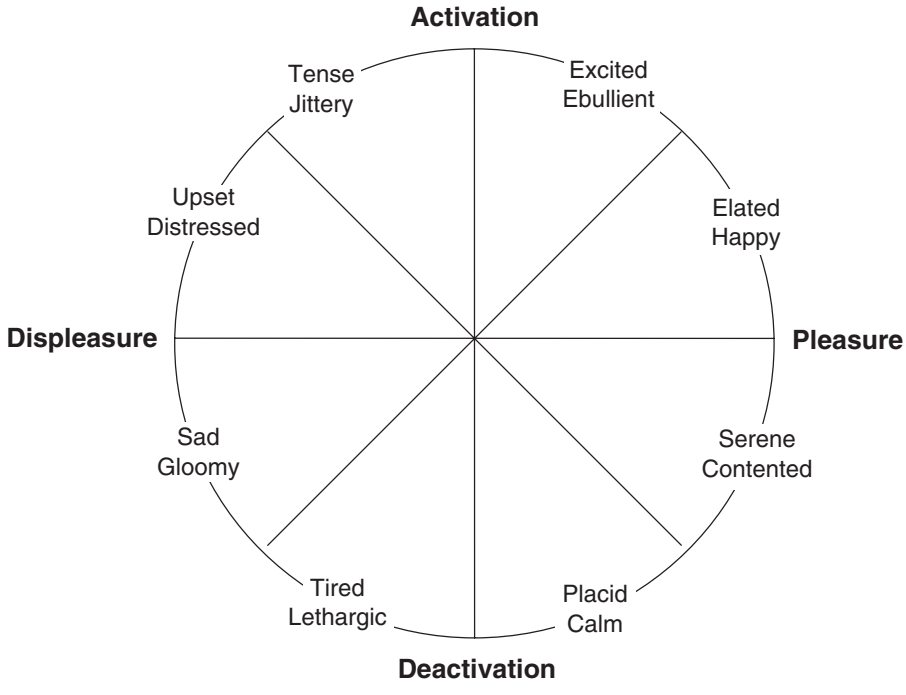
Concepts	Definition	Sources
Core affect	A neurophysiological state consciously accessible as a simple, nonreflective feeling that is an integral blend of hedonic (pleasure–displeasure) and arousal (sleepy–activated) values.	Russell (2003, p. 149)
Affective quality	The ability to cause a change in core affect.	Russell (2003, p. 149)
Attributed affect	In an attributed affect, a change in core affect is linked to its perceived cause. Thus, attributed affect is defined by three necessary and, when together, sufficient features: (a) a change in core affect; (b) an object; and (c) attribution of the core affect to the object.	Russell (2003, p. 149)
Perceived affective quality	An individual's perception of an object's ability to change his or her core affect. It is a perceptual process that estimates the affective quality of the object.	Zhang and Li (2004)
Object	A person, condition, thing, or event at which a mental state is directed.	Russell (2003, p. 149)
Trait	An enduring predisposition to response to stimuli across situations.	Weiss (2002); Weiss et al. (1999)
State	A subjective characteristic of an experience.	(Ellis, 1973)
Mood	Prolonged core affect with no object (simple mood) or with a quasi-object; affective states without an object or without a specific object	Frijda (1993); Russell (2003, p. 149)
Emotion	There is little convergence on emotion's definition. Generally, it is an affective state directed toward a specific object or objects.	Forgas (1995); Russell (2003, p. 149)
Affect	An umbrella for a set of more specific mental processes including emotions, moods, and attitudes.	Bagozzi et al. (1999)
Attitude	An individual's positive or negative feelings (evaluative affect) about performing the target behavior.	Fishbein and Ajzen (1975, p. 216)
Affective reaction toward interacting with an object	A person's subjective perception or judgment on whether interacting with the object will change his or her core affect or his or her emotion toward the object.	This research/paper
Cognitive reaction toward interacting with an object	Cognitive reasoning, or appraisal, or weighting of the implications of interacting with an object for one's well-being.	This research/paper

relationship. Moods, however, are affective states without any specific target object(s) and are usually viewed as "background" factors (Lazarus, 1991).

Trait and State

The distinction between trait and state is well studied in psychology, marketing and consumer research, and organizational and social psychology. Incidentally, the last two decades have seen an increased interest in the study of relationships between transient affective states and enduring

Figure 14.1 **A Circular Structure of Affect**



Source: Russell (2003).

personality characteristics (Ilies and Judge, 2002). Trait reflects the static aspect of information processing that impacts a broad range of variables. By contrast, affective states can be theorized as being "a product of variables such as stimuli reception context and individual differences" (Martin, 2003), and as varying over time and as having more dynamic influence on individuals' behavior (Schmukle et al., 2002). The trait is empirically confirmed to be a predictor of the average level of mood, a prolonged affective state (Weiss et al., 1999). From another perspective, state affect includes a "dispositional" component, which refers to the trait affect (Schmukle et al., 2002).

Trait variables have no direct influence on behavioral intention. Psychological research suggests that the influence of a trait variable on behavior is mediated by beliefs and affective factors (e.g., Fishbein and Ajzen, 1975).

The organizational behavior literature also supports the causal relationship between affective trait and state. For example, an individual's expression of affect at work could be strongly influenced by personality traits. Weiss (2002) argued that "affective state but not beliefs mediates the relationship between affective disposition (trait) and satisfaction" (p. 183). His argument is based on one of his earlier works (Weiss et al., 1999), in which he empirically suggested that daily mood levels mediate any effects of dispositional happiness on satisfaction. One mechanism through which affective trait exerts its influence is interpretation of job circumstances, which is considered a "stimulus" of affect change in the workplace. For example, Brief (1998) argued that affect traits determine how employees "interpret" the job circumstance, with "interpretation" referring to "how a person construes or apprehends the objective circumstances of his or her job" (p. 96).

Affect and Cognition

The distinction between affect and cognition has been studied extensively. A cognitive concept used in psychology research is appraisal, which refers to one's perception of an object's qualities such as its future prospects, its relevance to one's goals, its causal antecedents, and so on (Russell, 2003). Traditional psychological theories insist that affect is "post-cognitive"; that is, it occurs only when considerable cognitive operations have been accomplished (Zajonc, 1980). Zajonc (1980) drew a picture depicting a "typical information-processing model of affect," in which an affective reaction, such as liking, disliking, preference, evaluation, or the experience of pleasure or displeasure, is "based on a prior cognitive process in which a variety of content discriminations are made and features are identified, examined for their value, and weighted for their contribution" (p. 151). For example, a classic psychological theory, the theory of reasoned action (Fishbein and Ajzen, 1975), posits that cognitive beliefs predict individuals' attitude, which has an affective component.

The second paradigm on affect-cognition relationships, however, argues that affect and cognition are "separate and partially independent systems" (Zajonc, 1984). Affect could precede cognitive process in a behavioral chain. Or, in Zajonc's words, preferences need no inferences (1980). Berkowitz's three-step theory about how affect and cognition interact to influence behavior goes further and identifies two distinct types of affect: low-order affective reactions and high-order affective reactions (Berkowitz, 1993). While a low-order affective reaction is elicited by "relatively basic and automatic associative processes" (Berkowitz, 1993), a high-order affective reaction comes from a more deliberate cognitive processing. Therefore, affect may occur either before or after cognitive processing. Consistent with this theory, Epstein (1993) created cognitive-experiential self-theory (CEST), in which affect (called experiential system) and cognition (called rational system) operate in parallel.

All these theories share a single opinion that affect and cognition are interdependent. Even Zajonc's theory, which addresses affect's independence from cognition, admits that affect and cognition are just "partially" independent from each other and they usually "function conjointly" (1982). Similarly, Berkowitz (1993) argues in his theory that high-order affect arises from controlled, deliberate processes involved in thinking, reasoning, and consciousness. Leventhal (1984) suggests that affect arises from two sources, one of which is "a memory route" that involves cognitive and conceptual processing.

While the second paradigm seems more convincing and actually has become more and more accepted by researchers in psychology and other relevant fields, the first paradigm has also received theoretical and empirical support. Actually, we can regard the first paradigm on the cognition → affect causal flow as a part of the relationship between cognition and affect. Therefore, the next question is: How are affect and cognitive interdependent, and specifically, under what circumstance does affect influence cognition, or vice versa? Several theories tried to answer this question by introducing various moderators representing a variety of conditions.

Affect infusion model (AIM) (Forgas, 1995) identified four processing strategies, in which affect may have different influences on cognition, such as performance appraisal, reactions to feedback, and task perceptions. Affect infusion refers to "the process whereby affectively loaded information exerts an influence on and becomes incorporated into the judgmental process, entering into the judge's deliberations and eventually coloring the judgmental outcome" (p. 39). One mechanism of interest is affect priming, which implies that affect may indirectly influence judgments during substantive processing through its selective influence on attention, encoding, retrieval, and associative processes in a way similar to mood-congruence. Specifically, affect can selectively facilitate the learning of mood-congruent information, facilitate the recall of information

encountered in a matching rather than a non-matching affect state, and bias the interpretation of ambiguous social information (Forgas and George, 2001).

It is noteworthy that the impact of affect on cognition is situational, depending on personal variables, task characteristics, and situational features. Specifically, Forgas (1995) identified the factors that determine processing choice. Familiarity (with the target or stimuli), complexity and typicality, personal relevance, specific motivation, and cognitive capacity have been found to influence an individual's choice of processing strategies. Several previous studies suggest that more prolonged, extensive, complex, atypical or unusual, personally relevant, and less motivated processing increases the degree of affect infusion (Forgas, 1995; Forgas and George, 2001).

Marketing and consumer research also shows that affect, such as emotion (Chaudhuri, 2002) and valence of experience (Chen and Dubinsky, 2003), influences cognitive concepts such as perceived risk (Chaudhuri, 2002), and perceived product quality (Chen and Dubinsky, 2003), to name a few. Affect has various effects on cognition, such as retrieval effects, encoding effects, and state-dependent learning effects (Bagozzi et al., 1999). But basically, affect influences cognition through a mood-congruence mechanism (Bagozzi et al., 1999; Chen and Dubinsky, 2003). From a process perspective, Mattila and Wirtz (2000) argued that pre-consumption affect can be translated into post-purchase evaluations. Specifically, consumers' initial affective reaction may lead them to mood-consistent information, which is used to form associated cognitive structures.

Mood-congruence has received much attention in the literature. Several theoretical and empirical studies provided support to the principle of mood-congruence as the mechanism through which affect influences cognition. For example, Wegener et al. (1995) discovered that happy (versus sad) moods lead to more information messages in persuasive communication when a "pro-attitudinal/uplifting" position is taken, and lead to fewer information messages when a "counter-attitudinal/depression" position is taken.

Cognition influences affect as well. A task that requires more cognitive effort to evaluate can lead to more negative affect (Garbarino and Edull, 1997). Therefore, perceived ease of use of the artifact (e.g., Web sites) was proposed and empirically confirmed as an antecedent of affective reactions such as valence of experience (Chen and Dubinsky, 2003). In their research on e-commerce, ease of use of the Web site is the most influential factor among the three antecedents of valence of experience (ease of use, relevant information, and customer service), with an affective factor defined as "a consumer's emotional or attitudinal state aroused by the pre-purchase on-line shopping experience" (p. 327).

Affect, Attitude, and Behavior

Attitude often has been a dependent variable in organizational psychology, marketing, and consumer research. Attitude is normally defined as and often measured by "an individual's positive or negative feelings (evaluative affect) about performing the target behavior" (Fishbein and Ajzen, 1975, p. 216). It is one of the few concepts that have an affective component. Thus, it is important to examine the relationships between affect and attitude.

Marketing and consumer research shows that a person's affect such as his mood (e.g., Garbarino and Edull, 1997) or valence of experience (Chen and Dubinsky, 2003), can influence various aspects of cognitive information processing, including encoding and retrieval of information about the products, brands, services, and promotions, the advertisements, and customer loyalty (Bagozzi et al., 1999; Dube et al., 2003; Kroeber-Riel, 1984; Lu and Lin, 2002; Zhou and Bao, 2002).

Marketing and consumer researchers have historically taken the view that consumers' evaluations are based primarily on reason-based assessments of the target's characteristics (see Bettman

et al., 1998) and reason-based assessments of the target are often regarded as having higher normative/evidentiary status than feelings (Pham et al., 2001). However, affect sometimes provides judgmental responses that are potentially faster and more consistent across individuals, and subsequently more predictive (Pham et al., 2001). Pham et al.'s four empirical studies showed that affect performs better than cognition in predicting judgments. Similarly, Murry, Lastovicka, and Singh (1992) also suggest that affective state has a direct effect upon attitudes toward advertising.

Researchers in marketing and consumer research have identified several conditions under which affect has more influence. For example, Bagozzi et al. (1999) argued that when the processing of information in a communication is low (e.g., due to low motivation, distraction, low need for cognition, and weak arguments), emotional content in the communication gets processed directly and transfers to, or influences, attitude toward the product or advertisement. In other words, the consumer's affective mood has a direct effect on attitude when the likelihood of information processing is low. When the likelihood of information processing is high, the affective mood influences cognitive thoughts that are consistent with the mood.

Organizational behavior literature also demonstrates that affects such as mood (Weiss et al., 1999) and beliefs tend to independently predict attitude such as job satisfaction, defined as the overall evaluation one makes about one's job and measured by "like/dislike" and other criteria (Weiss, 2002; Weiss et al., 1999). First, several researchers empirically proved that affects and beliefs are distinct (Crites et al., 1994; Trafimow and Sheeran, 1998). Second, although they are independent, affects and beliefs jointly predict users' reactions toward stimuli (Abelson et al., 1982; Breckler and Wiggins, 1989; Crites et al., 1994). For example, Forgas (1995) argued that affects can influence evaluative judgments directly through the principle of "affect-as-information." Third, the relative importance of affects and beliefs varies. Sometimes, affect has higher regression coefficients for attitudes; at other times cognition has higher regression coefficients (Crites et al., 1994; Weiss, 2002).

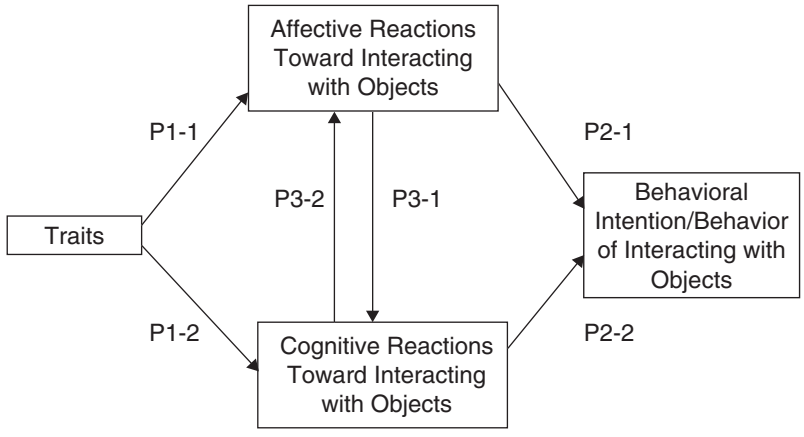
The relationship between predictive capabilities of affect and cognition for behavioral intention is also reported in the literature. Trafimow and Sheeran (1998) conducted four analyses trying to figure out which one accounts for more variance in behavioral intention for smoking. Their results showed that affect accounts for significant unique variance in intention, but that cognition has no such an impact on intention. However, in their studies, Trafimow and Sheeran (1998) further tested the impacts of affect and cognition on the study habits of college students. As expected, cognition, not affect, has significant impacts. Their findings suggest the strong moderating effects of the task.

An Abstract Model of the Individual Interacting with Objects

Based on the above discussions, we present a general or abstract model of various elements involved in the mental processes of an individual's interaction with an object (IIO) in his or her environment. Figure 14.2 depicts this model; all concepts used in the model were defined earlier in Table 14.1. The final dependent variables of the model are intention to interact with the object or/and the actual behavior during the interaction. Studies in psychology have demonstrated the strong relationship between these two dependent variables (Ajzen, 1985; Fishbein and Ajzen, 1975), which is beyond the scope of this paper.

The IIO model reflects the theoretical and empirical findings from existing literature discussed above such as those about (1) trait → affective reaction (Brief, 1998; Fishbein and Ajzen, 1975; Weiss, 2002; Weiss et al., 1999); (2) the interaction between affective and cognitive reactions (Bagozzi et al., 1999; Berkowitz, 1993; Chaudhuri, 2002; Chen and Dubinsky, 2003; Epstein, 1993; Fishbein and Ajzen, 1975; Forgas, 1995; Forgas and George, 2001; Garbarino and Edull,

Figure 14.2 **An Abstract Model of Individuals Interacting with Object (IIO)**



1997; Leventhal, 1984; Mattila and Wirtz, 2000; Wegener et al., 1995; Zajonc, 1980; Zajonc, 1984; Zajonc and Markus, 1982); and (3) trait → behavioral intention/behavior (e.g., Abelson et al., 1982; Bagozzi et al., 1999; Bettman et al., 1998; Breckler and Wiggins, 1989; Chen and Dubinsky, 2003; Crites et al., 1994; Dube et al., 2003; Fishbein and Ajzen, 1975; Garbarino and Edull, 1997; Kroeber-Riel, 1984; Lu and Lin, 2002; Murry et al., 1992; Pham et al., 2001; Trafimow and Sheeran, 1998; Weiss, 2002; Weiss et al., 1999; Zhou and Bao, 2002; Zigurs and Buckland, 1998).

The basic idea of the IIO model is that an individual's traits influence both affective reactions and cognitive reactions that he or she has toward interacting with the object. These two types of reactions influence each other, either at a different stage of the process or at the same time. These two reactions together determine the final behavioral intention or behavior of interacting with the object. We use the general term "interacting" to indicate different possible actions a person can have on objects. For example, in the IT context, interacting with objects can be using IT. In the consumer context, interacting with products can be buying products. We hope that this abstract model is general enough to be applied to a number of situations and contexts where individuals have to interact with objects in the environment.

The relationships in the model are represented in the form of propositions below. These propositions will be further verified or confirmed by studies in the IS field in the next section.

P1–1: Traits have impacts on affective reactions
P1–2: Traits have impacts on cognitive reactions
P2–1: Affective reactions influence behaviors/behavioral intentions
P2–2: Cognitive reactions influence behaviors/behavioral intentions
P3–1: Affective reactions influence cognitive reactions
P3–2: Cognitive reactions influence affective reactions

THE ROLE OF AFFECT IN IS

An extensive literature search through various databases and academic journals resulted in a total of fifty-one papers with affect and IS foci; these are reviewed in this research. Appendix 14.1 lists

Table 14.2

IT-Specific Concepts

Concepts	Definition	Sources
Microcomputer playfulness (CP)	A situation-specific individual characteristic representing a type of intellectual or cognitive playfulness and describing an individual's tendency to interact spontaneously, inventively, and imaginatively with microcomputers.	Webster and Martocchio (1992)
Personal innovativeness in IT (PIIT)	An individual trait reflecting a willingness to try out any new technology.	Agarwal and Karahanna (2000)
Computer anxiety	A "state anxiety" with computers, or, more generally, information technologies representing a personally threatening stimulus.	Coffin and MacIntyre (1999)
Flow	Holistic sensation that people feel when they act with total involvement.	Trevino and Webster (1992)
Cognitive absorption	A state of deep involvement with IT.	Agarwal and Karahanna (2000)
Perceived enjoyment	The extent to which the activity of using computers is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated.	Davis et al. (1992)
Perceived playfulness	The strength of one's belief that interacting with the World Wide Web will fulfill the user's intrinsic motives.	Moon and Kim (2001)
Attitude toward using IT	An individual's positive or negative feelings (evaluative affect) about performing the target behavior.	Davis et al. (1989, p. 984)
Satisfaction with using IT	Users' affect concerning (feeling about) their prior IT use.	Bhattacherjee (2001)
Perceived usefulness (PU)	The degree to which a person believes that using a particular technology will enhance his or her performance.	Davis (1989, p. 320)
Perceived ease of use (PEOU)	The degree to which a person believes that using a particular system would be free of effort.	Davis (1989, p. 320)
Computer self-efficacy (CSE)	An individual's beliefs about his or her capabilities to use computers.	Compeau et al. (1999, p. 147)

these papers and the outlets. Before getting to the details of the examination, Table 14.2 summarizes the important concepts that are IS-specific and discussed in this section.

In this section, IS is identified as a unique discipline, distinct from other disciplines that have been reviewed in previous sections. Then, affect-related concepts are examined. Consequently, an IT-specific model of IIO is presented to predict the relationships among the affective concepts and other important concepts. A set of IT-specific propositions is listed along the discussion of the existing studies. It is hoped that the specific model and the propositions will guide additional theoretical and empirical studies on the role of affect on individual interactions with IT.

The Uniqueness of IS Concerns

While applying theoretical works from relevant disciplines, we need to take the uniqueness of the IS field into consideration.

Different from organizational behavior, marketing and consumer research, the IS discipline is concerned with individuals' behaviors toward particular types of objects: information and communication technology, or IT as we often use the term. In addition, such concerns are situated mostly in organizational, managerial, and business contexts. Such contexts make both the affective and cognitive reactions toward using IT unique as well.

In IS, work or job-oriented technologies are commonly studied. In other words, users are more likely to be extrinsically motivated. This argument can in part be proved by the salient importance of usefulness, which indeed is viewed as "extrinsic motivation" by some researchers (e.g., Davis et al., 1992) in determining users' behavioral intentions (Sun and Zhang, 2006). We notice that prior studies, however, are generally focused on effectiveness-related information technologies such as spreadsheets and word processors (Jackson et al., 1997), customer dial-up systems (Subramanian, 1994), database management systems (DBMSs) (Szajna, 1994), managerial systems (Venkatesh and Davis, 2000), telemedicine technology (Chau and Hu, 2002), and information retrieval systems (Venkatesh and Davis, 2000), all of which usually bring out extrinsic motivations (Sun and Zhang, 2006). Given the heavy emphasis on the effectiveness of IT in jobs and work, the question of whether affect plays a role in its use remains. To answer these questions, relevant concepts being studied in IS are examined next.

IT-Specific Concepts and a Model

Using different terms with different definitions and measures, prior researchers have explored affect from different perspectives. In order to facilitate discussion, the studied terms were "standardized" by relating them to the key concepts introduced in the section "Theoretical Grounds and an Abstract Model." When necessary to make the points clear, original definitions used in the studies are cited and their meanings in terms of the "standard" concepts are explained.

Traits

Two trait variables, microcomputer or computer playfulness (CP) and personal innovativeness in IT (PIIT), have gained considerable attention in IS research. The basic distinction between traits and states merits mention again. In general, traits refer to comparatively stable characteristics of individuals that are relatively invariant to situational stimuli (Webster and Martocchio, 1992). States, on the other hand, refer to affective or cognitive episodes that are experienced in the short run and that fluctuate over time (Webster and Martocchio, 1992).

Although affect can be either a trait or a state (Webster and Martocchio, 1992), computer playfulness is traditionally used as a trait variable. Microcomputer playfulness represents a type of intellectual or cognitive playfulness and describes an individual's tendency to interact spontaneously, inventively, and imaginatively with microcomputers (Webster and Martocchio, 1992). The computer playfulness scale (CPS) (Webster and Martocchio, 1992) consists of seven items: spontaneous, unimaginative, flexible, creative, playful, unoriginal, and uninventive. The seven-item construct is confirmed to have temporal stability (during the five weeks of the experiment's duration) and situational consistency, which implies that computer playfulness is a trait variable (Yager et al., 1997). This measurement is confirmed to be valid and reliable and therefore is widely used when trait affect is studied (Agarwal and Karahanna, 2000; Atkinson and Kydd, 1997; Venkatesh, 2000).

The other salient trait variable is personal innovativeness in IT (PIIT) (Agarwal and Karahanna, 2000). All four items measuring PIIT focus on individuals' willingness to try "new" information technologies.

It is noteworthy that both trait variables are IT-specific; that is, they are defined specifically for the IT-related situations. The studies we are aware of yield another two trait variables that are more general: negative affectivity, which is an aspect of neuroticism and is a broad stable trait that influences individuals' emotions and behavior (Thatcher and Perrewe, 2002), and trait anxiety, which refers to a general tendency to experience anxiety when confronted with problems or challenges (Thatcher and Perrewe, 2002). In their empirical study, Thatcher and Perrewe (2002) failed to confirm negative affectivity's influence on computer anxiety, giving rise to speculations that a broadly conceptualized trait such as neuroticism or extraversion may exert a less pervasive influence on situational individual difference than do situation-specific traits (Thatcher and Perrewe, 2002; Webster and Martocchio, 1992). Therefore, for the purpose of this study, we use IT-specific traits instead of general personality variables as trait indicators.

Affective Reactions

Although they have different names, the above concepts share some common characteristics; that is, they all have to do with perceived impact on users' core affect.

Computer anxiety is one of the relatively frequently studied affective reactions toward using IT. It is a "state anxiety," with the computer, or, more generally, information technology representing a personally threatening stimulus (Coffin and MacIntyre, 1999). Computer anxiety is proposed and confirmed to be important in forming users' behavioral intention or actual behavioral (Brosnan, 1999; Compeau and Higgins, 1995; Compeau et al., 1999) and cognitive reactions (e.g., Brosnan, 1999; Hackbarth et al., 2003; Venkatesh, 2000).

Flow represents an affective state, characterized by feelings of control, attention focus, and curiosity and intrinsic interest (Trevino and Webster, 1992). A person experiencing flow is motivated more by intrinsic needs than by extrinsic rewards. In contrast to those motivated by extrinsic rewards, individuals experiencing flow state focus more on the process than on the outcomes.

Flow is a multi-dimensional construct. Some researchers have defined it as possessing three dimensions—control, concentration, and enjoyment (e.g., Csikszentmihalyi, 1975; Csikszentmihalyi, 1988; Ghani et al., 1991; Trevino and Webster, 1992; Webster et al., 1993). Other researchers, however, have proposed different dimensions of flow (e.g., Trevino and Webster, 1992). Nonetheless, two dimensions, enjoyment and concentration, have been the cores of any flow definition. More explicitly, Ghani and Deshpande (1994) argued that two key characteristics of flow are: (1) total concentration on an activity; and (2) the enjoyment one derives from the activity. In the IT context or in computer-mediated environments, flow has been found to lead to increased communication, exploratory behavior, learning, positive affect, increased computer use, etc. (Finneran and Zhang, 2005; Finneran and Zhang, 2003).

A similar concept is cognitive absorption, referring to a state of deep involvement with IT (Agarwal and Karahanna, 2000). Five dimensions of cognitive absorption have been identified: temporal dissociation, focused immersions, heightened enjoyment, control, and curiosity. Compared with flow, cognitive absorption includes all the three dimensions of flow, enjoyment, concentration, and control. Researchers also noticed this overlap and viewed cognitive absorption as a "state of flow" (Agarwal and Karahanna, 2000).

Another set of affective reaction variables consists of perceived enjoyment and other similar concepts such as perceived fun (Brosnan, 1999; Igbaria et al., 1996), physical arousal and affective reward (Reinig et al., 1996), positive mood (Martocchio, 1992), computer liking (Al-Khaldi and Al-Jabri, 1998), perceived affective quality of IT (Zhang and Li, 2004), and affect (Cheung, 2000).

While their names imply affective components, attitude and satisfaction, which have been extensively studied within the last two decades, deserve further discussion. Borrowed mainly from Theory of Reasoned Action, attitude is defined as "an individual's positive or negative feelings (evaluative affect) about performing the target behavior" (Davis et al., 1989). The definition of satisfaction in the IS field is very similar to those used in marketing and organizational behavior research. Actually, researchers who study users' satisfaction directly refer to the definitions of satisfaction. Both attitude and satisfaction are considered affect factors; satisfaction is conceptually distinct from attitude in that satisfaction is a transient and experience-specific affect, while attitude is relatively more enduring. Thus, a user may have a positive attitude (with a pleasant experience) but may still feel dissatisfied if his or her actual experience is below expectation (Bhattacherjee, 2001 p. 607).

Table 14.3 lists the definitions, sources, and original measures of affective concepts studied in IS research, along with their reinterpretations using the affective and cognitive reaction concepts defined in the section "Theoretical Grounds and an Abstract Model." For affective reactions, the two dimensions (arousal and pleasure) are considered. Most of these original measuring items can be reinterpreted by the two reaction concepts. It is noteworthy that researchers sometimes use experiments to gain more accurate user descriptions of their affective reactions under the assumption the users may not recall their spontaneous affective reactions. For example, Venkatesh and Speier (2000) randomly assigned subjects to two different training interventions, game-based and traditional interventions respectively, each of which had three 2-hour sessions. After the last session, subjects were given a knowledge test.

Several interesting observations can be obtained from Table 14.3. First, there is little consistency or agreement between the terms used and their measures: the same term may mean different concepts or may be measured differently, and the same concept may be defined as different terms. Second, the meanings of the affective concepts do not always fall within the affective reaction dimensions. Some have to do with a mix of affective and cognitive reactions (Compeau and Higgins, 1995; Moon and Kim, 2001). Third, the measures of some concepts of affective reaction emphasize one dimension more than the other: Flow, perceived playfulness, and cognitive absorption have more measuring items for arousal than pleasure, while enjoyment (Igbaria et al., 1995) has more items for pleasure than for arousal.

Cognitive Reactions

Compared to trait and affective reaction variables, cognitive reaction variables are well studied in literature. Several major concepts have been proposed and tested, among which we identify three major concepts: perceived usefulness, perceived ease of use, and computer self-efficacy. Perceived usefulness (PU) and perceived ease of use (PEOU) are widely used in IS research when studying users' adoption of IT. Perceived usefulness has been confirmed as an important, if not the most important, factor that influences user technology acceptance and therefore has received a great deal of attention from prior researchers (Sun and Zhang, 2006). There is almost no doubt that usefulness is the most important issue in determining users' intentions. Because of its importance, almost all models or theories that we are aware of include similar (if not totally the same) concepts, with perceived usefulness such as outcome expectation in the computer self-efficacy model (Compeau and Higgins, 1995), extrinsic motivation in the motivational model (Davis et al., 1992), and performance expectancy in the united theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003).

Another salient variable is perceived ease of use. Similar concepts are also found in several other theories or models such as effort expectancy in UTAUT, and perceived complexity in Thompson

Table 14.3

Affective Factors Studied in IS

Affective Factor Definition and Source	Original Measure Items	Affective Reaction? Arousal	Affective Reaction? Pleasure	Cognitive Reaction?	Note
Affect: The feelings of joy, elation, pleasure, depression, disgust, displeasure, or hate associated by an individual with a particular act (Thompson et al., 1991). Also used in Al-Khaldi and Wallance (1999) and Cheung et al. (2000)	1. PCs made work more interesting.	√			
	2. Working with PCs was fun.	√	√		
	3. PCs were all right for some jobs but not for the kind of job wanted (reverse scored).	√			
Affect: Liking of particular behavior (Compeau and Higgins, 1995a, 1995b). Also used in Compeau et al. (1999)	1. I like working with computers.	√			
	2. I look forward to those aspects of my job that require me to use a computer.	√			
	3. Once I start working on the computer, I find it hard to stop.	√			
	4. Using a computer is frustrating for me.	√	√		
	5. I get bored quickly when working on a computer.	√	√		
Affective reward: The positive emotional response sometimes associated with goal attainment (Reinig, 1996)	Would like to do again:	√			
	Stimulating	√			
	Arousing	√			
	Dull	√			
	Fulfilling	√			
	Efficient	√			
	Accomplished	√			
	Won	√			
	Dissatisfying	Unclear			
	Excellent	√			
	Enjoyable	√			
	Gratifying	√			
	Boring	√			
	Motivated	√			
	Satisfying	Unclear			
	Interesting	√			

Attitude: An individual's positive or negative feelings (evaluative affect) about performing the target behavior (Davis, 1989; Davis et al., 1989)	Using the system is: A good idea Pleasant/unpleasant Beneficial to the task	 √ √		Summative
Attitude: (Moon, 2001) Defined the same way as defined by Davis et al. (1989)	Using a computer is: Good/bad Wise/foolish Pleasant/unpleasant Positive/negative	 Unclear √ √		Summative
Cognitive absorption: A state of deep involvement with software (Agarwal and Karahanna, 2000)	Temporal dissociation Focused immersion Heightened enjoyment Control Curiosity	√ √ √ √ √	 √ 	
Computer anxiety: The tendency of individuals to be uneasy, apprehensive, or fearful about current or future use of computers (Brosnan, 1999; Coffin and MacIntyre, 1999; Compeau and Higgins, 1995b; Compeau et al., 1999; Durndell and Haag, 2002; Karahanna et al., 2002; Perry and Ballou, 1997; Thatcher and Perrewe, 2002; Webster et al., 1990)	Computer anxiety rating scale (CARS): 1. I feel insecure about my ability to interpret a computer printout. 2. I look forward to using a computer. 3. I do not think I would be able to learn a computer programming language. 4. Learning about computers is an exciting challenge. 5. I am confident that I can learn computer skills. 6. Anyone can learn to use a computer if he or she is patient and motivated. 7. Learning to operate computers is like learning any new skill—the more you practice, the better you become. 8. I am afraid that if I begin to use computers I will become dependent upon them and lose some of my reasoning skills. 9. I am sure that with time and practice I will be as comfortable working with computers as I am in working with a typewriter. 10. I feel that I will be able to keep up with the advances happening in the computer field. 11. I dislike working with machines that are smarter than I am. 12. I feel apprehensive about using computers. 13. I have difficulty in understanding the technical aspects of computers.			

(*continued*)

Table 14.3 (*continued*)

Affective Factor Definition and Source	Original Measure Items	Affective Reaction? Arousal	Affective Reaction? Pleasure	Cognitive Reaction?	Note
	14. It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key.				
	15. I hesitate to use a computer for fear of making mistakes that I cannot correct.				
	16. You have to be a genius to understand all the special keys contained on most computer terminals.				
	17. If given the opportunity, I would like to learn about and use computers.				
	18. I have avoided computers because they are unfamiliar and somewhat intimidating to me.				
	19. I feel computers are necessary tools in both educational and work settings.				
Computer anxiety: Fear of computers or the tendency of a person to be uneasy, apprehensive and phobic towards current or future use of computers in general (Al-Khaldi and Al-Jabri, 1998; Venkatesh, 2000)	Computers do not scare me at all.	√			
	Working with a computer makes me nervous.	√			
	I do not feel threatened when others talk about computers.	√	√		
	It wouldn't bother me to take a computer course.	√	√		
	Computers make me feel uncomfortable.	√	√		
	I feel at ease in a computer class.	√			
	I get a sinking feeling when I think of trying to use a computer.	√	√		
	I feel comfortable working with a computer.	√	√		
	Computers make me feel uneasy.	√			
Computer anxiety: The apprehension or fear that results when an individual is faced with the possibility of using an IS (Hackbarth et al., 2003)	Does not scare me	√	√		
	Have lots of self-confidence	√			
	Get a sinking feeling	√	√		
	Feel comfortable	√	√		
	Feel okay about trying a new problem	Evaluative			
	No good	Evaluative			
	Not the type to do well	√	√		
	Do not feel threatened	√	√		

Computer anxiety: (Beckers and Schmidt, 2001; Chou, 2001; Rozell and Gardner, 2000)	Computer Anxiety Scale (CAS): 1. Computers will never replace human life. 2. Computers make me uncomfortable because I don't understand them. 3. People are becoming slaves to computers. 4. Computers are responsible for many of the good things we enjoy. 5. Our lives will soon be controlled by computers. 6. I feel intimidated by computers. 7. There are unlimited possibilities of computer applications that have not been thought of yet. 8. Overusing computers may be harmful and damaging to humans. 9. Computers are dehumanizing to society. 10. Computers can eliminate a lot of tedious work. 11. The use of computers is enhancing our standard of living. 12. Computers turn people into just another number. 13. Computers are lessening the importance of too many jobs now done by humans. 14. Computers are a fast and efficient means of gaining information. 15. Computers' complexity intimidates me. 16. Computers will replace the working human. 17. Computers are bringing us into a bright new era. 18. Computers will soon run our world. 19. Life will be easier and faster with computers. 20. Computers are difficult to understand and frustrating to work with.		
Computer liking: Liking or enjoying working with computers (Al-Khaldi and Al-Jabri, 1998)	Like	√	
	Appeal	√	
	Enjoyable and stimulating	√	√
	Stick with it	√	
	Hard to stop	√	
Flow: Holistic sensations that people feel when they act with total involvement (Ghani et al., 1991. Also used in Koufaris, 2002)	How did you feel during the particular group exercise:		
	Interesting/uninteresting	√	
	Enjoyable/not enjoyable	√	√
	Exciting/dull	√	
	Fun/not fun	√	√
	Was absorbed intensely in activity	√	

(*continued*)

Table 14.3 (*continued*)

Affective Factor Definition and Source	Original Measure Items	Affective Reaction? Arousal	Affective Reaction? Pleasure	Cognitive Reaction?	Note
	Attention was focused on activity	√			
	Concentrated fully on activity	√			
	Was deeply engrossed in activity	√			
Flow: A temporary state of playfulness, characterized by feelings of control, attention focus, and curiosity and intrinsic interest (Webster and Martocchio, 1995; Webster et al., 1993)	Lost control	√			
	Absorbed	√			
	Excited by my curiosity	√			
Flow: An extremely enjoyable experience, where an individual engages in an online game activity with total involvement, enjoyment, control, concentration, and intrinsic interest (Hsu and Lu, 2003)	Do you think you have ever experienced flow in playing an online game?	√	√		
	In general, how frequently would you say you have experienced "flow" when you play an online game?	√	√		
Fun: (Perry and Ballou, 1997)	To what extent was the Excel training fun?	√	√		
	How enjoyable was the Excel training?	√	√		
	Most of the time I play an online game I feel that I am in flow.	√	√		
Perceived affective quality: An individual's perception of an object's ability to change his or her core affect (Zhang and Li, 2004)	1. Arousal quality	√			
	2. Sleepy quality	√			
	3. Pleasant quality	√			
	4. Unpleasant quality	√			
Perceived enjoyment: The extent to which the activity of using computers is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated (Davis et al., 1992). Also used in Igbaria et al. (1996); Atkinson and Kydd (1997);	1. I find using the system to be enjoyable.	√	√		
	2. The actual process of using the system is "unpleasant/pleasant."	√			
	3. I have fun using the system (likely/unlikely).	√	√		

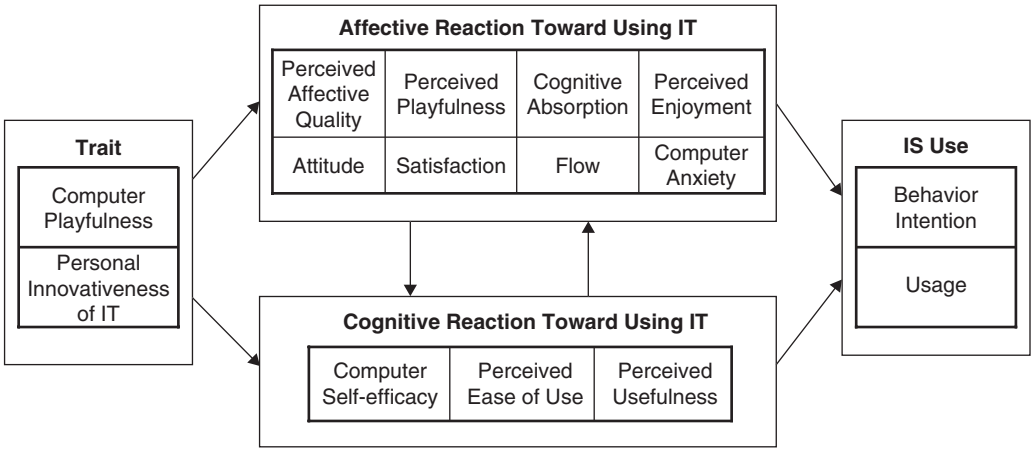
Venkatesh (2000); Venkatesh and Speier (2000); Venkatesh (2002); Yi and Hwang, (2003)			
Perceived enjoyment: A user's intrinsic motivation to use a technology (Igbaria et al., 1995). Also used in Teo et al. (1999)	Using a computer in my job is: Fun-frustrating Pleasant-unpleasant Negative-positive Pleasurable-painful Exciting-dull Foolish-wise Enjoyable-not enjoyable	 √ √ √ √ √ Unclear √	 √ √
Perceived playfulness: The strength of one's belief that interacting with the World Wide Web will fulfill the user's intrinsic motives (Moon and Kim, 2001)	1. I do not realize the time has elapsed. 2. I am not aware of any noise. 3. I often forget the work I must do. Using the World Wide Web: 4. Makes my task enjoyable. 5. Makes my task fun. 6. Keeps me happy during my task. 7. Stimulates my curiosity. 8. Leads to exploration. 9. Arouses my imagination.	√ √ √ √ √ √ √ √ √	 √ √
Play: (Perry and Ballou, 1997)	To what extent do you expect the Excel training to be like "play"? To what extent do you expect it to feel like you are playing in the Excel training?	√ √	√ √
Playfulness: (Liu and Arnett, 2000)	Enjoyment Excitement Feeling of participation Charming Escapism	√ √ √ √ Unclear	√
Physical arousal: (Beckers and Schmidt, 2001)	I feel like I am short of breath when I am in front of the computer. I have sweaty palms when I work with the computer.	 	√ √

(*continued*)

Table 14.3 (*continued*)

Affective Factor Definition and Source	Original Measure Items	Affective Reaction? Arousal	Affective Reaction? Pleasure	Cognitive Reaction?	Note
Satisfaction: Service satisfaction (of an application service provider [ASP]): a positive affective state resulting from the appraisal of all aspects of a firm's working relationship with another firm (Susarla et al., 2003)	My company's senior management is satisfied with security and privacy offered by the ASP. My company's senior management is willing to share workload and information with an ASP. My company's management information systems (MIS) department is satisfied with the security and privacy offered by the ASP. Our MIS is willing to share workload and information with an ASP. Overall, I am satisfied with the ASP's way of implementing IS projects.			Unclear what "satisfied" means in this paper.	
Satisfaction: Users' affect regarding (feeling about) prior online banking division use (Bhattacherjee, 2001)	Your overall experience of online banking division use is: Very dissatisfied/very satisfied. Very displeased/very pleased. Very frustrated/very contented. Absolutely terrible/absolutely delighted.	 √ √ √	 √ 	Unclear	

Figure 14.3 **A Model of Individual Interaction with IT (IIIT)**



et al.'s model (1991). Although less important than PU, PEOU has been confirmed to significantly influence users' behavioral intention or actual usage behaviors (e.g., Davis, 1989; Taylor and Todd, 1995; Taylor and Todd, 1995; Venkatesh and Davis, 2000; Venkatesh et al., 2003).

PU and PEOU are two major cognitive determinants of users' adoption of information technologies, while other factors are supposed to influence users' behavioral intention or actual usage via these two factors (Davis, 1989). Computer self-efficacy (CSE) also is believed to play an important role in individuals' decision making. CSE is closely related to affect factors such as affect and anxiety, and other cognitive concepts such as PU (Compeau et al., 1999) and PEOU (Venkatesh, 2000).

A Model of Individual Interaction with IT (IIIT)

Based on the above examination, an IT-specific model of an individual's interacting with IT can be constructed by applying the abstract model IIO shown in the section "Theoretical Grounds and an Abstract Model." The final dependent variables are the same: behavioral intention to use IT and usage of IT. For the affective reactions, all existing terms but the two "affects" are relatively recognizable and studied in IS. These terms are used as they were defined. Figure 14.3 depicts the IT-specific model, which denotes individual interaction with IT (IIIT).

Our main goal here is to illustrate the big picture of important contributors to individual interaction with IT. Therefore, we focus on the relationships among the clusters of components such as traits, affective reaction, cognitive reaction and behavioral intention/usage. Due to the scope of this paper, we omit the specific relations among specific affective reactions and among cognitive reactions, even though existing studies provided empirical evidence showing the existence of these relations. For example, studies have identified that computer self-efficacy influences perceived ease of use and perceived usefulness (Compeau and Higgins, 1995; Compeau and Higgins, 1995).

The main idea of IIIT is that personal traits influence both affective and cognitive reactions toward using IT; affective and cognitive reactions influence each other, and together they determine IT use intention and behavior. The specific propositions in the abstract model of IIO should be applicable here in the IIIT model. In the next section, relationships among the related concepts are analyzed to confirm and validate the general propositions.

Table 14.4

The Impacts of Traits on Affective Reactions Toward Using IT

Article ID	Trait (IV)	Affective Reaction (DV)	P1–1 Supported?
Agarwal and Karahanna (2000)	CPS	Cognitive absorption	Yes
	PIIT	Cognitive absorption	Yes
Martocchio and Webster (1992)	CPS	Positive mood	Yes
Thatcher and Perrewe (2002)	Trait anxiety	Computer anxiety	Yes
	PIIT	Computer anxiety	Yes
Webster and Martocchio (1992)	CPS	Computer anxiety	Yes
Webster and Martocchio (1995)	CPS	Flow	Yes
Sun and Zhang (2004)	CPS	Perceived enjoyment	Yes

IV: Independent variable. DV: Dependent variable. CPS: Computer playfulness. PIIT: Personal innovativeness in IT.

Table 14.5

The Impacts of Traits on Cognitive Reactions

Article ID	Trait (IV)	Cognitive Reaction (DV)	P1–2 Supported?
Hackbarth et al. (2003)	CPS	PEOU	Yes
Karahanna et al. (2002)	PIIT	Relatively advantages of GSS	Yes
Venkatesh (2000)	CPS	PEOU	Yes
Sun and Zhang (2004, Model 2)	CPS	PEOU	Partial yes

CPS: Computer playfulness. PEOU: Perceived ease of use. PIIT: Personal innovativeness in IT.

Examination of the Relationships in IIIT

The Impacts of Traits

Table 14.4 summarizes empirical findings on relationships between traits and affective reactions; Table 14.5 shows relationships between traits and cognitive reactions. These results are compared to the general propositions derived from the IIO model. Developed based on the empirical evidence and the general propositions, these IT-specific propositions can guide additional empirical studies and practice on the role of affect in the IS field.

Table 14.4 posits that a user's trait variables, computer playfulness, and personal innovativeness in IT can predict his or her affective reaction. Agarwal and Karahanna (2000) tested the impacts of both of the two trait variables on the users' affective reaction named cognitive absorption using the World Wide Web as the target technology.

Computer playfulness may predict users' perceptions, especially PEOU, in that those people who are more playful with information technologies in general are expected to indulge in using a new IT just for the sake of using it, rather than for the specific positive outcomes associated with use (Venkatesh, 2000). These "playful" users tend to underestimate the difficulties of using a new

technology since they quite simply enjoy the process and do not perceive it as requiring effort compared to those who are less playful (Venkatesh, 2000).

It is noteworthy that a recent study indicates the possible full mediating effect of perceived enjoyment between computer playfulness and perceived ease of use (Sun and Zhang, 2004). Computer playfulness has a significant effect on perceived ease of use. However, when perceived enjoyment is introduced as a mediator between computer playfulness and perceived ease of use, the relationship between computer playfulness and perceived ease of use becomes non-significant, and the relationship between computer playfulness and perceived enjoyment and that between perceived enjoyment and ease of use are significant. This result indicates a mediating effect of perceived enjoyment in the relationships between computer playfulness and perceived ease of use. More empirical studies are needed to further validate and generalize this argument about the linkage between traits and cognitive reactions.

Empirical studies (e.g., Karahanna et al., 2002) have found that PIIT can predict the formation of users' perceptions such as perceived usefulness. More innovative users have more positive perceptions of the usefulness of information technologies.

Tables 4 and 5 show some gaps in the current IS studies. For example, we found very few empirical studies focusing on the following relationships: CPS on perceived playfulness, perceived enjoyment (except Sun and Zhang, 2004), attitude and satisfaction, and PIIT on perceived playfulness, perceived enjoyment, flow, attitude, and satisfaction. Further explorations of these links may provide more insight into how individuals' traits influence their affective reactions toward using IT.

The Affective Antecedents of Behavioral Intention

For the purpose of this paper, we focus only on the affective antecedents of behavioral intention/usage. For the cognitive reactions as antecedents, please refer to other technology acceptance papers. Table 14.6 shows empirical evidence of affective reactions as antecedents of behavioral intention/usage. In general, these influences are direct ones, as hypothesized by P2–1. For example, Agarwal and Karahanna (2000) argued that contrary to the prediction that the influence of cognitive absorption on behavioral intention would be fully mediated by belief concepts, cognitive absorption has a direct significant impact on BI. Zhang and Li also find that perceived affective quality of a course management system has a direct impact on intention to use the system (Zhang and Li, 2004).

However, some exceptions do exist. For example, an affective reaction variable, named affect in Thompson et al.'s research, fails to precede users' actual usage behaviors (1991). Interestingly, Cheung et al. (2000) recently retested this model and again found the impact of affect on usage to be insignificant. Thompson et al. argue that the insignificant influence of affect on actual usage is a result of the "different theoretical structures" from other research on affect and implies that affect may have an indirect impact on usage via intention. Nevertheless, other research confirmed that affective reaction variables could have significant impacts on usage. We thus attribute the failure of affect to predict usage in Thompson et al.'s and following Cheung et al.'s research to poorly defined and ill-measured concepts. Actually, their measurements have a relatively low reliability (Cronbach's Alpha = 0.61), which at least partially supports our argument.

Using the same measurement in Davis et al. (1992) but a different name (intrinsic motivation), Venkatesh et al.'s (2002) finding of the impact of enjoyment is inconsistent with Davis et al.'s. The inconsistency is very likely to be a result of the different theorized relationships between ease of use and affect factors, named respectively intrinsic motivation and enjoyment in their studies. While Davis et al. argued that ease of use predicts the affect (enjoyment), Venkatesh et al. suggested another relationship: Affect (intrinsic motivation) predicts ease of use. From another

Table 14.6

Affective Reaction's Impacts on BI/Usage

Article ID	Affective Reaction (IV)	BI/B (DV)	P2–1 Supported?
Agarwal and Karahanna (2000)	Cognitive absorption	BI	Yes
Al-Khaldi et al. (1998)	Computer anxiety	Usage	Yes
	Computer liking	Usage	Yes
Al-Khaldi and Wallance (1999)	Affect	Usage	Yes
Atkinson and Kydd (1997)	Enjoyment	Usage	Yes
Brosnan (1999)	Computer anxiety	Usage	Yes
Cheung et al. (2000)	Affect	Usage	No
Compeau and Higgins (1995a)	Affect	Usage	Yes
	Anxiety	Usage	Yes
Compeau et al. (1999)	Affect	Usage	Yes
	Computer anxiety	Usage	No
Davis (1989)	Attitude	BI	Yes
Davis et al. (1989)	Attitude	BI	Yes
Davis et al. (1992)	Enjoyment	BI	Yes
Hsu and Lu (2003)	Flow	BI	Yes
Hu et al. (1999)	Attitude	BI	Yes
Igbaria et al. (1995)	Perceived enjoyment	Usage	Partially yes
Igbarai et al. (1996)	Perceived fun/enjoyment	Usage	Yes
Koufaris (2002)	Flow	BI	Partially yes
Moon and Kim (2001)	Perceived playfulness	BI	Yes
Rozell and III (2000)	Affective reaction	Future computer-related performance	Yes
Sun and Zhang (2004)	Perceived enjoyment	BI	No
Teo et al. (1999)	Perceived enjoyment	Usage	Partially yes
Thompson et al. (1991)	Affect	Usage	No
Venkatesh and Speier (2000)	Perceived enjoyment	BI	Yes
Venkatesh et al. (2002)	Intrinsic motivation (Perceived enjoyment)	BI	No
Zhang and Li (2004)	Perceived affective quality	BI	Yes
Zhang and Li (2005)	Perceived affective quality	BI	No

IV: Independent variable. DV: Dependent variable. BI: Behavioral intention.

perspective, this inconsistency reflects the interaction between these two concepts, which will be discussed in the next section.

In a different study investigating the effect of perceived affective quality (PAQ), Zhang and Li find that perceived affective quality of a university Web site does not have a direct impact on behavior intention of using the Web site (Zhang and Li, 2005), which is different from that in Zhang and Li (2004). One possible reason for the difference is the voluntariness of IT use: Participants were required to use the course management system in the study where PAQ has a direct impact on BI (Zhang and Li, 2004).

As for the cognitive reaction variables, much prior IS research has already confirmed a strong influence of cognitive reaction variables on behavioral intention or actual usage behavior. In another words, proposition 2–2 is supported by the literature. In this study, we haven't discussed these relationships in detail because it is not the focus of this research. (For more details, please refer to Sun and Zhang [2006]).

Table 14.7

Affective Reaction → Cognitive Reaction

Article ID	Affective Reaction (IV)	Cognitive Reaction (DV)	P3–1 Supported?
Agarwal and Karahanna (2000)	Cognitive absorption	PU	Yes
	Cognitive absorption	PEOU	Yes
Beckers and Schmidt (2001)	Physical Arousal	Beliefs	Yes
	Affective feeling	Beliefs	Partially yes
Brosnan (1999)	Perceived fun	CSE	Yes
	Computer anxiety	PU	Yes
	Computer anxiety	PEOU	Yes
Coffin and MacIntyre (1999)	Computer anxiety	CSE	Yes
Durndell and Hagg (2002)	Computer anxiety	CSE	Yes
Hackbarth et al. (2003)	Computer anxiety	PEOU	Yes
Rozell and III (2000)	Computer anxiety	CSE	No
Karahanna et al. (2002)	Computer anxiety	Relative advantage	No
Sun and Zhang (2004)	Perceived enjoyment	PEOU	Yes
Thatcher and Perrewe (2002)	Computer anxiety	CSE	Yes
Venkatesh (2000)	Computer anxiety	PEOU	Yes
	Enjoyment (state)	PEOU	Yes
Venkatesh et al. (2002)	Intrinsic motivation (Perceived enjoyment)	PU	Yes
	Intrinsic motivation (Perceived enjoyment)	PEOU	Yes
Yi and Hwang (2003)	Enjoyment	PU	Yes
	Enjoyment	PEOU	Yes
	Enjoyment	CSE	Yes
Zhang and Li (2004)	Perceived affective quality	PU	Yes
	Perceived affective quality	PEOU	Yes

IV: Independent variable. DV: Dependent variable. PU: Perceived usefulness. PEOU: Perceived ease of use. CSE: Computer self-efficacy.

The Relationship Between Affective and Cognitive Reactions

Examination of the IS literature indicates that affective reactions and cognitive reactions are quite distinguishable and have a reciprocal relationship (Tables 14.7 and 14.8). For example, while Davis et al. (1992) confirmed the effects of perceived ease of use on enjoyment, Venkatesh (2000) argued that perceived enjoyment also influenced perceived ease of use. Another example is the reciprocal impact between computer self-efficacy and affect and anxiety (Compeau and Higgins, 1995; Compeau et al., 1999; Thatcher and Perrewe, 2002). In fact, the theoretical basis of the computer self-efficacy model, social learning theory (SLT), suggests that self-efficacy and anxiety influence each other (Bandura, 1977). We will examine each direction separately.

Affective reactions → Cognitive reactions. Table 14.7 summarizes the impacts affective reactions have on cognitive reactions.

In general, the proposed influence of affective reaction on cognition reactions in IIO is confirmed in IS studies (Table 14.7) with few exceptions. While named differently and emphasizing

different aspects, affective reaction variables have significant influence on cognitive reaction variables. Similar to the principle of mood-congruence, there is likely to be a natural propensity to overlook the affective aspects of an activity by attributing instrumental value (Agarwal and Karahanna, 2000). Users may rationalize that they are "voluntarily spending a lot of time on this activity and enjoying it, therefore, it must be useful" (Agarwal and Karahanna, 2000, p. 676). Venkatesh et al. (2002) also hypothesized and lately confirmed that intrinsic motivation increases the deliberation and thoroughness of cognitive processing and leads to enhanced perceptions of extrinsic motivation conceptualized as perceived usefulness. Similarly, Yi and Hwang (2003) tested and confirmed the effects of enjoyment on perceived usefulness. Perceived enjoyment also has a very strong effect on perceived ease of use. Actually researchers argued that it may be the strongest antecedent of perceived ease of use (Sun and Zhang, 2004). Computer anxiety is also confirmed to negatively influence PU (Brosnan, 1999). Generally speaking, less anxious computer users are more likely to perceive IT to be useful (Brosnan, 1999).

There are, however, some exceptions. Karahanna et al.'s research (2002) attributed the insignificant influence of computer anxiety on PU to users' experience, which makes the computer anxiety "not a significant consideration in their evaluation" (p. 337). The insignificant link between computer anxiety and computer self-efficacy in Rozell and Gardner's research (2000) may be due to the complexity of the proposed model used in their studies.

Affective reactions also influence PEOU. All articles (Agarwal and Karahanna, 2000; Sun and Zhang, 2004; Venkatesh, 2000; Venkatesh et al., 2002; Yi and Hwang, 2003) that discussed the effects of affective reaction variables on PEOU also empirically confirmed this relationship (Table 14.7). Positive affective reactions encourage more mental resources to be allocated to the task or to the interaction with the technologies of interest. High arousal, usually with "temporal dissociation," as suggested in flow theory, makes individuals perceive themselves as possessing ample time to complete a task, which in turn reduces the perception of workload associated with using the technologies (Agarwal and Karahanna, 2000). The above discussion indicates that both dimensions of affect, arousal and valence, lead to perceived ease of use. In Venkatesh et al.'s research (Venkatesh et al., 2002), intrinsic motivation is supposed to make individuals "underestimate" the difficulty associated with using the technologies since they enjoy the process itself and do not perceive it to be arduous compared to those people with less intrinsic motivation. Computer anxiety, negative affective state, also has influence on PEOU (Brosnan, 1999; Hackbarth et al., 2003; Venkatesh, 2000). Users with lower levels of computer anxiety tend to regard IT as being easier to use. Resource allocation theory argues that lower levels of computer anxiety can also be seen as a result of anxiety reduction by directing some of the attentional resources to an off-task activity, which usually increases the effort required to accomplish tasks (high PEOU) (Venkatesh, 2000).

Affective reaction factors are also related to CSE. Although not studied frequently, the impacts of affective reaction factors such as fun (Brosnan, 1999) and enjoyment (Yi and Hwang, 2003) on CSE are empirically found to be significant. Computer anxiety is also confirmed to have significant impacts on CSE (Coffin and MacIntyre, 1999; Durndell and Haag, 2002; Thatcher and Perrewe, 2002). Bandura's theory of self-efficacy argues that self-efficacy beliefs are strengthened by anxiety reduction (Bandura, 1977).

It is noteworthy that the literature review yields an impression that PEOU is more related to affect than PU. While PU is generally viewed as an extrinsic motivation, PEOU, together with affective factors, is viewed as an intrinsic motivation (Atkinson and Kydd, 1997). PEOU and affective reaction factors—e.g., enjoyment—show similar patterns that are different from that of PU. Specifically, Atkinson and Kydd's research (1997) indicated that intrinsic motivation variables, PEOU and enjoyment, are important in predicting use of the Web for entertainment purposes,

Table 14.8

Cognitive Reaction → Affective Reaction

Article ID	Cognitive Reaction (IV)	Affective Reaction (DV)	P3–2 Supported?
Beckers and Schmidt (2001)	Computer self-efficacy	Physical arousal	No
	CSE	Affective feeling	No
Bhattacherjee (2001)	PU	Satisfaction	Yes
Brosnan (1999)	CSE	Computer anxiety	Yes
	PEOU	Computer anxiety	Yes
	CSE	Perceived fun	Yes
Cheung et al. (2000)	Complexity	Affect	Yes
Chung and Tan (2004)	PU	Perceived playfulness	Yes
Compeau and Higgins (1995a)	CSE	Affect	Yes
	CSE	Computer anxiety	Yes
	Outcome expectation (PU)	Affect	Yes
Compeau et al. (1999)	CSE	Affect	Yes
	CSE	Computer anxiety	Yes
	Outcome expectation (PU)	Affect	Yes
Davis (1989)	PU	Attitude	Yes
	PEOU	Attitude	Yes
Davis et al. (1989)	PU	Attitude	Yes
	PEOU	Attitude	Yes
Davis et al. (1992)	PEOU	Enjoyment	Yes
Durndell and Hagg (2002)	CSE	Computer anxiety	Yes
Hsu and Lu (2003)	PEOU	Flow experience	Yes
Hu (1999, p. 2374)	PU	Attitude	Yes
	PEOU	Attitude	No
Igbaria et al. (1995)	PEOU	Perceived enjoyment	Yes
Igbarial et al. (1996)	Perceived complexity (PEOU)	Perceived fun/enjoyment	Yes
Moon and Kim (2001)	PEOU	Perceived playfulness	Yes
	PEOU	Attitude	Yes
Teo et al. (1999)	PEOU	Perceived enjoyment	Yes
Webster and Martocchio (1995)	CSE	Flow	No

IV: Independent variable. DV: Dependent variable. CSE: Computer self-efficacy. PU: Perceived usefulness. PEOU: Perceived ease of use.

while PU is not. On the other hand, PU, as an extrinsic motivation variable, is important in predicting Web use for course-related purposes, while PEOU and enjoyment don't have significant impacts. Venkatesh's research (Venkatesh, 2000) also empirically found the close association between enjoyment and PEOU. Our literature review yields the same results. Table 14.7 shows that all studies confirm the significant relationships between affect-related factors and PEOU.

Cognitive reactions → affective reactions. Table 14.8 indicates that the proposed impact of cognitive reactions on affective reactions in IIO (P 3–2) is generally supported, although some exceptions exist.

First, PU could influence users' affective reactions significantly. Generally the satisfaction derived from the positive perception of usefulness is attributed to the IT usage, causing an increasing affective reaction to IT (Compeau and Higgins, 1995).

Second, PEOU's impact on affective reaction variables receives substantial theoretical and empirical supports. In the motivational model created by Davis et al. (1992), ease of use is hypothesized to precede enjoyment since it is a source of information relevant to feelings of self-efficacy,

competence, and self-determination; self-efficacy is one of the major factors theorized to underlie affective reactions (Bandura, 1982; Bandura, 1977). Flow theory also suggests that the feasibility of the activity for an individual encourages flow (Csikszentmihalyi, 1988). Information technologies that are threatening and difficult to use are less likely to be enjoyable for users. PEOU may also negatively relate to computer anxiety. Considering that PEOU is closely related to computer self-efficacy and that computer self-efficacy is confirmed to have significant effects on computer anxiety, it is very likely that PEOU is significantly related to computer anxiety. Brosnan (1999) empirically confirmed this effect.

Exceptions do exist. For example, Hu et al. (1999) failed to confirm the PEOU's anticipated impact on attitude. Hu et al. attributed this failure to their subjects, physicians, who have above-average general competence and therefore can "assimilate a new technology quickly and become familiar with its operation without as intense training as might be necessary for other user populations" (p. 105). This result actually echoes our argument in the first section that studies of attitude show mixed results. Consistent with our argument, the impact of perceived usefulness on BI is not totally mediated by attitude, which confirms the "independence" of affective and cognitive reactions.

CSE's impacts on affective reaction variables are also widely studied. The major work has been done by Compeau and Higgins (1995) who adapted Bandura's social cognitive theory to the IS field. Computer self-efficacy influences users' affective reactions in that users tend to enjoy using information technologies when they feel they are capable of mastering them successfully. Conversely, when they do not feel they can handle IT, users dislike it or have negative affective reactions to it (Compeau and Higgins, 1995). Bandura's self-efficacy theory also confirmed this relationship, arguing that individuals experience anxiety in attempting to perform certain behaviors that they do not feel competent to perform (Bandura, 1977). Those with higher self-efficacy are more likely to experience positive affect than those with lower self-efficacy. This causal relationship is empirically confirmed in IS literatures (Brosnan, 1999; Compeau and Higgins, 1995; Compeau et al., 1999; Durndell and Haag, 2002).

There are some exceptions. For instance, Beckers and Schmidt (2001) failed to confirm the impact of computer self-efficacy on affect, which was separated into physical arousal and affective feelings in their research. Their findings, however, indicated that contrary to their expectation, computer literacy, which refers to users' actual experience with computers, has a significant relationship with computer self-efficacy and affect factors (Beckers and Schmidt, 2001). In other words, computer literacy mediates CSE's influence on physical arousal and affective feeling. Therefore, they argued that self-efficacy might influence physical arousal and affective feelings only to the extent that it raises computer literacy (Beckers and Schmidt, 2001). So we still expect a significant relationship between CSE and affective reaction factors after controlling the computer literacy factor.

DISCUSSIONS AND CONCLUSION

Affect receives remarkably less attention from IS researchers than cognition. However, affect has been confirmed to be critical in understanding human behavior in fields such as psychology, marketing, and consumer and organizational behavior research. While studying affect-related concepts, IS researchers focus on different aspects of affect and its role in individual reactions toward using IT. The relationships between affective factors and other types of factors, such as cognitive or behavioral factors, are less consistent in the existing IS research. In addition, few studies have attempted to examine the role of affect systematically in order to guide research and practice.

Motivated by the advances in other fields, we try to establish a model of the individual interacting with IT where affect is an integral and important part. This model also holds existing findings together in a cohesive way, and thus is able to explain existing IS research. Further, it has

potential for a better understanding of the role of affect in the IS field. The IIIT model is based on a general model of the individuals interacting with objects (IIO) in the environment, and draws upon solid research in three relevant disciplines: psychology, marketing and consumer research, and organizational behavior. Both the IIO and IIIT models are theoretically sound and can explain empirical evidence found in existing studies.

The proposed IIIT model draws on many prior studies, such as the technology acceptance model (Davis, 1989; Davis et al., 1989), computer self-efficacy model (Compeau and Higgins, 1995), cognitive absorption (Agarwal and Karahanna, 2000), and flow (Finneran and Zhang, 2003; Ghani et al., 1991), to name a few, and it reassembles them in a novel way by positioning clear relationships among the related concepts.

It is noteworthy that the IIIT model reflects only the key components and their relationships. In a complex world, more factors may come into play. For example, many IS studies have shown that social norms, facilitating factors, task natures, and user experience, among others, can influence user behavior intention and usage of IT. In other words, the relationships depicted in the IIIT model can be situational, and moderating factors could come into play. For example, Venkatesh (2000) found that experience moderates the effect of trait variable (computer playfulness) on users' perceptions of ease of use: trait influences PEOU only for inexperienced users. Experienced users' affective reaction of "perceived enjoyment" has more influence on PEOU. It was argued that with increasing experience, system use may become more routine, less challenging, and less discovery-oriented, and, therefore, perceived enjoyment derived from actual interaction with the system becomes more critical in forming users' perceptions of ease of use. A task's characteristics have also been confirmed to have significant moderating effects. For example, Atkinson and Kydd (1997) hypothesized and empirically confirmed the moderating effects of the task's purpose. Users of work-related tasks are more driven by extrinsic motivation, measured as PU, while users of entertainment-related tasks are more driven by intrinsic motivations, one of which is enjoyment. Task complexity has shown to have moderating effects. According to the affect infusion model, more complex tasks recruit more extensive processing strategies, increasing the scope of affect infusion, which means more influence of affect on cognition (Forgas, 1995). Another related concept is the task's novelty. The more complex a task, the more likely that individuals constantly receive novel information and have to interpret and assimilate it into a pre-existing representational system, a process in which affect is supposed to play an important role (Forgas, 1995). All these findings suggest the importance of moderating effects.

This research calls for more attention to affect-related factors. In this study, we mentioned several times that some of the deficiencies of existing theories and models in explaining users' behavior may be due to their ignoring the role of affect. This study goes further and confirms that affect does matter in determining users' behavioral intentions and actual usage behaviors. Affect also has significant influence on cognitive factors. Future researchers can go in several directions. First, the synthesis of the existing affect-related concepts may be helpful. As we can see in the IIIT model, several affect-related concepts that are correlated have been named and conceptualized differently in prior studies. Therefore, synthesis may be a good way to contribute to this stream of research. Second, the interactions between affect and other groups of factors deserve more attention. Third, as we suggested in a prior text, the distinctions between different types of affect (e.g., trait vs. state) should be identified. Fourth, the dimensions of affect deserve more attention. Psychological research could be a valuable reference source of affect dimensions. For example, Russell and colleagues produced the affect grid, which received lots of attention in psychology (Russell, 2003; Russell and Barrett, 1999). It may be a good starting point to study the dimensions of affect as well as their different relationships with other factors.

This study also has implications for practitioners. This research calls for their attention to IT users' affective reactions. Integrating IT with organizational and social environment, practitioners should not ignore users' affective reactions to their technologies, which are supposed to be related to their performance usage behavior. ITs are no longer "cold machines." More personalized ITs are needed to improve users' use and subsequent performance. This research suggests that affect can be influenced by users' traits and can influence users' cognition and behaviors through various mechanisms.

There are a few limitations of this study. First, we haven't considered the influence of users' demographic characteristics while focusing on the task and experience. The exclusion, however, does not mean that these factors are not important. Actually, several IS literatures noticed and tested the impact of gender on affect-related factors, especially computer anxiety. The second limitation of this study is the relative small pool of literature examined, due to time and space limits; this may bias our findings. Considering more previous studies may increase the validity of our findings.

APPENDIX 14.1. LIST OF IS STUDIES REVIEWED IN THIS PAPER

Table 14.9

Articles for Review

Article ID	Journal	Article ID	Journal
Agarwal and Karahanna (2000)	*MIS Quarterly*	Karahanna et al. (2002)	*Decision Support Systems*
Agarwal and Prasad (1998)	*Information Systems Research*	Koufaris (2002)	*Information Systems Research*
Al-Khaldi and Al-Jabri (1998)	*Computers in Human Behavior*	Liu and Arnett (2000)	*Information & Management*
Al-Khaldi and Wallace (1999)	*Information & Management*	Martocchio (1992)	*Personnel Psychology*
Atkinson and Kydd (1997)	*DATA BASE*	Moon and Kim (2001)	*Information & Management*
Beckers and Schmidt (2001)	*Computers in Human Behavior*	Perry and Ballou (1997)	*DATA BASE*
Bhattacherjee (2001)	*MIS Quarterly*	Reinig et al. (1996)	*Journal of Management Information Systems*
Brosnan (1999)	*Computers in Human Behavior*	Rozell and Gardner (2000)	*Computers in Human Behavior*
Cheung (2000)	*Decision Support Systems*	Sun and Zhang (2004)	*Proceedings of The Third HCI/MIS Workshop*
Chou (2001)	*Computers in Human Behavior*	Susarla et al. (2003)	*MIS Quarterly*
Chung and Tan (2004)	*Information & Management*	Teo et al. (1999)	*Omega*
Coffin and MacIntyre (1999)	*Computers in Human Behavior*	Thatcher and Perrewe (2002)	*MIS Quarterly*
Compeau and Higgins (1995a)	*Information Systems Research*	Thompson et al. (1991)	*MIS Quarterly*
Compeau and Higgins (1995b)	*MIS Quarterly*	Venkatesh (1999)	*MIS Quarterly*

(*continued*)

Table 14.9 (*continued*)

Article ID	Journal	Article ID	Journal
Compeau et al. (1999)	*MIS Quarterly*	Venkatesh (2000)	*Information Systems Research*
Davis (1989)	*MIS Quarterly*	Venkatesh and Speier (2000)	*International Journal of Human-Computer Studies*
Davis et al. (1989)	*Management Science*	Venkatesh et al. (2002)	*Decision Sciences*
Davis et al. (1992)	*Journal of Applied Social Psychology*	Webster et al. (1990)	*Proceedings of The Eleventh International Conference on Information Systems*
Durndell and Haag (2002)	*Computers in Human Behavior*	Webster and Martocchio (1992)	*MIS Quarterly*
Ghani et al. (1991)	*Proceedings of the Twelfth International Conference on Information Systems*	Webster et al. (1993)	*Computers in Human Behavior*
Gill (1996)	*MIS Quarterly*	Webster and Martocchio (1995)	*Journal of Management*
Hackbarth et al. (2003)	*Information & management*	Yager et al. (1997)	*DATA BASE*
Hsu and Lu (2003)	*Information & Management*	Yi and Hwang (2003)	*International Journal of Human-Computer Studies*
Hu et al. (1999)	*Journal of Management Information Systems*	Zhang and Li (2004)	*Proceedings of the Twenty-Fifth International Conference on Information Systems*
Igbaria et al. (1995)	*Information & Management*	Zhang and Li (2005)	*Communications of the ACM*
Igbaria et al. (1996)	*Journal of Management Information Systems*		

NOTE

1. It is worth noting that IT-related services have gained a great deal of attention in the IS field, and consequently a number of studies have focused on individual reactions toward utilizing services. In this paper, we use IT for parsimonious reasons and keep our discussions focused.

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