1-1-2010

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Soussan Djamasbi, Diane M. Strong, Mark Dishaw, Affect and acceptance: Examining the effects of positive mood on the technology acceptance model, *Decision Support Systems*, Volume 48, Issue 2, January 2010, Pages 383-394, ISSN 0167-9236, 10.1016/j.dss.2009.10.002.
(http://www.sciencedirect.com/science/article/pii/S0167923609002115)

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ABSTRACT
While the technology acceptance model (TAM) is generally robust, TAM's antecedent constructs, ease of use and usefulness of a system, do not always adequately explain acceptance behavior. Recent studies argue that including individual characteristics in TAM is a way to determine those conditions under which ease of use and usefulness are not adequate for explaining acceptance behavior. Using this argument, we examine the effects of positive mood, one individual characteristic that significantly affects an individual's cognition and behavior, on acceptance of a DSS that supports uncertain tasks. Our results show that positive mood has a significant influence on DSS acceptance and that its influence on users' behavior is not due to a halo effect.

Key Words: *Decision Support Systems, Mood, Positive Mood Theory, Affect, Uncertainty, Computerized decision aids, Behavioral intention, Ease of Use, Usefulness, Technology Acceptance Model*

1. Introduction

Decision support systems are among a class of systems used to support managerial decisions and actions [68] and thus their successful adoption is of great importance for organizational performance. Despite being useful decision making tools, these systems are not always readily accepted by their users [78]. Consequently, the technology acceptance model (TAM) [16], which is often a reliable predictor of user acceptance of a new technology, has been used in many DSS studies to examine adoption behavior [53]. TAM, however, has been recently criticized for focusing primarily on external factors (e.g., users' perceptions of ease of use and usefulness of a system) and not paying enough attention to internal factors that affect cognition and behavior, specifically users' individual characteristics [58-60]. For example, TAM loses its predictive power when certain individual characteristics, such as one's preference for unstructured situations are considered [60]. Such results underline the need for acceptance studies that examine individual characteristics, especially those characteristics that affect cognition and behavior.

To address this need, our DSS adoption study examines one individual characteristic that significantly affects cognition and behavior, namely users' affective state, i.e., their moods and emotions.

While the acceptance literature acknowledges the role of affect in adoption behavior [56], it primarily focuses on the affective reactions (attitude) of users toward the use of IT, not their affective state (moods and emotions) when they are introduced to IT [56]. While "how people feel about a technology" is highly relevant to the acceptance literature, theoretical and empirical findings in various fields suggest that "how people feel in general" is also highly relevant to adoption of a new DSS. Our affective states provide an underlying framework for our thoughts and behavior [28]. They are a necessary component in rational decision making ([for a review of this literature see 15, 62]). Because of their essential role in how we make rational choices [36, 62], affective states are likely to influence whether we choose to adopt a DSS. Examining the role affect plays in DSS acceptance can help to identify conditions under which ease of use and usefulness may not be enough to predict DSS adoption [e.g., 53, 60]. Given the importance of DSS in organizations [12] , such an examination is of both theoretical interest and practical value.

2. Background

This section provides a review of the theories used in this study. It starts with a short review of the technology acceptance model and explains briefly the importance and relevance of affect in the DSS acceptance literature.

2.1. Technology Acceptance Model (TAM)

TAM is one of the most influential Information Systems (IS) theories. It is solidly grounded in the Theory of Reasoned Action [2], a psychological theory that explains users' intention to perform a behavior. For TAM, the behavior being considered is using an IT. Thus, the outcome construct in TAM is users' behavioral intention (BI) to use an IT. In TAM, BI is influenced by Perceived Usefulness (PU), defined as the degree to which individuals believe using the system would improve their performance [17], and Perceived Ease of Use (PEU), defined as the degree to which individuals believe using a particular system would be effortless [17]. Furthermore, PEU influences PU [17].

While many TAM studies support both PU and PEU as significant direct effects on BI and the resulting usage, other studies have found that PEU has stronger effects through PU than as a direct effect on BI. Some researchers argue that the mixed results for the direct effect of PEU on BI in TAM are task related [53], and thus have suggested that careful task specifications could be a useful addition to TAM studies [19]. Although individual-level technology adoption research, e.g., TAM-related research, is one of the most widely studied areas of IS research, there are still a number of productive research avenues, including the role of individual characteristics that influence cognition [60], such as affect [56], which is the focus of our study.

2.2. Affect and Rational Decision Making

There is substantial evidence supporting affect as a necessary and important component of rational decision making. As neuroscience studies show, making rational choices without affect is at best impractical, at worst impossible [15]. For patients who cannot process feelings due to brain injuries, rational decisions – as simple as setting up an appointment – become a continual process of evaluating all possible alternatives, ranging from different appointment times to possible fluctuations in weather conditions [15]. While a process that checks all possible alternatives provides an optimal solution, it is very lengthy, mentally taxing, and impractical. Consider the number of decisions or choices one makes in a day. Checking all possible alternatives of all decisions would not only be mentally exhausting, but would also be nearly impossible given the limited hours in a day.

Affect works in conjunction with our rational calculations to stop us from exhaustive exploration of every imaginable alternative [15, 62]. Rather than evaluating all possible alternatives, affect helps us eliminate those that do not “look right” or “feel right” so that we explore only a manageable subset of possibilities. Thus, a rational actor when making decisions is executing a combined sequence of cognitive and affective processes [15, 62].

2.3. Affect: Moods vs. Emotions

Affect refers to one’s feeling state or how one feels when performing some task or activity [33]. Thus, affect is defined as one’s moods and emotions [30, 32]. While moods and emotions are both affective states they differ in intensity, specificity, and pervasiveness. Moods are less intense affective states than emotions [30, 32]. Unlike emotions, moods do not necessarily have a specific cause (e.g., a provocative act) or a target (e.g., target of anger) [28]. Unlike volatile emotions, moods are pervasive and enduring. Because of these characteristics, moods provide a suitable affective framework for studying cognitive processes, particularly in an organizational context [28]. Hence, our study of affect and DSS acceptance behaviors focuses on moods, not emotions. While affect refers to both moods and emotions, when we use the term “affect” in this paper, we are focusing on moods rather than emotions.

2.4. General Mood Categories: Positive, Negative, and Neutral

While there are many specific moods, e.g., sadness, joy, fear, happiness and frustration, mood states in research studies are typically grouped into more general categories such as positive, neutral, and negative mood based on theoretical and empirical arguments [10]. Furthermore, the theoretical foundation for positive mood differs from that for negative mood [30]. Thus, focusing on a single mood category and its theoretical foundation facilitates making sound theoretical and empirical contributions [30, 43].

In this study, we focus on the effects of positive mood on acceptance of a DSS. The effects of positive mood on cognition are robust across tasks, including solving anagrams, doing word associations, choosing among items, and diagnosing cancer [e.g., 25, 26, 44, 49, 52], across contexts ranging from traditional laboratory settings to hospital settings [e.g., 26, 51, 63], and across populations ranging from undergraduate students to senior medical students to practicing physicians [e.g., 25, 26, 49]. Thus, positive mood effects are likely to extend to the DSS acceptance context as well.

2.5. Positive Mood Theory

This study is grounded in the positive mood theory [43] a prominent psychology theory. According to the positive mood theory, being in a positive mood influences how our thoughts are organized and accessed. The organization and accessibility of our thoughts, in turn, influence what comes to mind first or most easily, which shape our decisions [43]. When individuals are in a positive mood, they have access to a network of positive material in their cognitive system which is diverse, elaborately connected, and flexible. Because positive material in one’s memory is rich and elaborate, when in a positive mood one has access to an abundant quality and quantity of positive thoughts to aid in one’s cognitive processes [30, 43]. For example, an elaborate network of positive thoughts can facilitate careful, elaborate, and systematic evaluations ([for reviews of this literature see 43]). Because adopting a new DSS often calls for careful evaluation, users’ positive mood may play a role in whether or not they choose to adopt a DSS. Moreover, because mood effects hold in an organizational context [28], examining positive mood effects on DSS adoption can have important practical implications for managers.

2.6. Task Characteristics and Positive Mood Effects

Task characteristics play a crucial role in studies of positive mood effects [43]. According to positive mood theory [43], being in a positive mood state can significantly improve an individual's cognitive processing. Such improvements, however, do not always yield better performance; they depend on the task, i.e., whether the task requires the enhanced cognitive capability of people in positive mood [40]. For example, people in a positive mood outperform their control counterparts in complex tasks such as diagnosing cancer (in which their ability to see more varied aspects of stimuli and to integrate those aspects into decisions more efficiently is beneficial), but not for simple tasks such as searching for a specific sequence of letters in text (in which such cognitive abilities are not needed). Deciding whether or not to adopt a new technology, such as a DSS, requires cognitive abilities beyond those needed for simple tasks. As a result, being in a positive mood is likely to affect DSS adoption behavior.

In this study we examine the effects of positive mood on adoption of a DSS that supports a complex planning task [66][1]. Planning requires making assessments about future events based on available information, thus it belongs to a class of tasks that are inherently uncertain [35]. Outcomes of decisions based on such assessments are subject to changes in the environment, for example, the task information. Even when made by the most knowledgeable experts, planning decisions can be only as accurate as the uncertainty of the environment allows. A planning task is thus irreducibly uncertain because assessing future events by its very nature is probabilistically bounded by the randomness in the task environment [35]. For example when planning a project, assessments of the workload, completion time, budget, and likelihood of profitability are affected by variables external to organizations ranging from changes in regulations to fluctuations in supplier actions or customer demand [37]. Thus, planning tasks, such as the one in our experiment, benefit from the enhanced cognitive capability of people in positive mood who can more efficiently integrate the available information into decisions [20].

[1] "Campbell (1988) developed a topology of task complexity that incorporated earlier work in the area (Payne 1976, Wood, 1986). In his topology, the production scheduling task would be assigned high ratings on three of his four complexity measures (presence of uncertainty, conflicting interdependence, and multiple paths to the desired end states). Thus it is a reasonably complex real decision task and should avoid the criticism of simplistic task used in some studies." [66, p. 96].

In addition to satisfying the theoretical need for a cognitively difficult task when studying positive mood effects [27, 40], a planning task has the virtue of being relevant and practical. Because planning is an integral part of many business tasks and an important concern of managers, it provides a suitable context for acceptance studies in general and our study in particular. Uncertain planning tasks, such as the one used in our study, have particularly high practical value because today's business environment is characterized by uncertainty, ambiguity, and turbulence [11, 71]. Consequently, planning tasks have been extensively used in the decision making and DSS literature [18, 20, 21, 54, 57, 67, 68].

2.7. Can Organizations Manage Moods?

Some might argue that establishing positive mood as a significant variable for explaining acceptance behavior, while a theoretical contribution, is of little practical value because moods are impractical to manage. Specifically, moods can be influenced by experiences outside the organization (e.g., morning traffic, spousal arguments, etc.). While companies do not have control over external factors that can potentially affect one's moods, they have control over many factors that can facilitate positive moods within the organization [e.g., 30, 55, 65]. Because positive moods can lead to improved organizational outcomes (for a review of these effects see [5]), organizational behavior research has examined how companies can foster positive moods (for a review of this literature see [7]). Essentially, managers can create a pleasant work environment that facilitates positive mood. Given that we spend most of our waking hours at work (e.g., 9-5), the malleability of moods means that managers can play a great role in sustaining their employees' mood at least for the time they are at work. If positive mood affects acceptance, then managers can focus these efforts on ensuring employees' positive mood state when they first encounter a new technology. Managers who know how affect and adoption decisions are related will be better equipped to utilize its desirable effects and compensate for its unattractive consequences. Thus, considering affect in acceptance models is of practical relevance to managers.

3. Theoretical Framework and Hypotheses

This research investigates the effects of positive mood on acceptance of a DSS that supports uncertain planning tasks. This study includes two mood conditions (positive mood and control, i.e., no mood manipulation) and two task uncertainty levels (moderate and high). Task uncertainty in this study, like in the decision making literature, refers to the unpredictable fluctuations or randomness in the task environment such as unexpected changes in the information needed to complete the task [35].

Positive mood effects may interact with task uncertainty. Specifically, we expect mood effects to hold as in the literature for moderate uncertainty, but not for high uncertainty tasks. We first present our positive mood hypotheses, only claiming that they hold for the moderate uncertainty case. We then present hypotheses that capture how these effects may differ in the high uncertainty case.

3.1. Does Positive Mood Change TAM Estimates under Moderate Task Uncertainty?

Individual characteristics can have a significant influence on TAM estimates [59]. For example, preference for unstructured situations affects TAM's predictive power, i.e., PEU and PU do not explain BI for people who prefer unstructured situations [60]. McCoy et al. [60] argue that such individual characteristics affect one's cognition and behavior and hence influence how TAM constructs are related.

Positive mood is an individual characteristic that can significantly affect cognition and behavior [30, 43]. Positive mood may influence the relationships among TAM constructs through its effect on cognitive organization, which makes it possible to see more different aspects of a stimulus. For example, when people in a positive mood are asked to categorize objects (e.g., group objects and/or people into categories), they tend to group the material more flexibly than their control counterparts because they see unusual but reasonable ways for considering category memberships [43]. Using this theoretical argument about categorization, positive mood was found to affect the relationships among the concepts of effort, performance, and reward. That is, positive mood can influence the association people make between how hard they work (effort) and how well they do (performance) and between their performance and its resulting outcome such as satisfaction and rewards [25].

According to TAM, people are willing to use an IT that they consider easy to use and useful. Thus, TAM reflects how people associate the concepts of ease of use, usefulness, and intention to use an IT [59, 60]. Applying the above discussed mood literature to TAM, we would expect to see different relationships among the TAM constructs for those in a positive mood, as compared to their control counterparts. Because of positive mood effects on cognition, those in a positive mood are likely to see more varied aspects of PEU, PU, and BI and thus to relate them differently. Since significant relationships in TAM reflect the associations people make between the TAM constructs, the differences in the way people relate ideas and concepts will be captured by differences in TAM's relationships [60]. Thus, we hypothesize that:

> ***H1:*** *Under moderate task uncertainty, TAM's relationships in the positive mood treatment will differ from those in the control treatment.*

3.2. Are Positive Mood Effects on TAM Due to Response Bias?

In this section we argue that positive mood effects on intention to use a DSS are due to cognitive evaluation of the system, i.e., through positive mood effects on ease of use and usefulness, not due to response bias. If positive mood effects on DSS acceptance are due to response bias, then people would rate all the TAM constructs more favorably simply because they are happy. This is also referred to as a halo effect. To demonstrate that positive mood effects are not halo effects, we argue in the following paragraphs that positive mood (1) affects ease of use and usefulness and (2) does not directly affect intention to use (BI), but only affects BI indirectly through TAM's antecedent variables, perceived ease of use and perceived usefulness.

Positive mood facilitates chunking of information, which enables the utilization of both existing and new information more effectively. Thus, those in a positive mood can be both more thorough and more efficient decision makers [43]. Although being both thorough and efficient may seem incongruous, this behavior is theoretically explained by the elaborate network of positive material in memory of those in positive mood states. The rich cognitive context of people in positive mood enables them to discern more dimensions, and in turn, to recognize more possibilities that can be combined and integrated for better decision making. Evidence supports the efficiency and thoroughness effects predicted by positive mood theory for tasks ranging from selecting cars differing along several dimensions [45] to determining whether patients have lung or liver cancer [26, 49]. These enhanced abilities of those in a positive mood state should contribute both to enhanced ability to learn a new system and thus to PEU and to enhanced recognition of the various ways a new system could be useful and thus to PU.

People in a positive mood also exhibit significantly less confusion and a greater integration of information when solving complex problems, and as a result, are less overwhelmed by the task and tend to be more open to absorbing and integrating new information [43] For example, fourth-year medical students, when in a positive mood, were significantly less confused and overwhelmed by the task of diagnosing lung cancer [49]. On a regular busy day in a hospital, practicing physicians in a positive mood were significantly more flexible in integrating new information when diagnosing liver cancer and were less likely to ignore or distort information not supporting the solution they were considering [26].

The ability to integrate new information more effectively and be less overwhelmed by the task can be particularly helpful when adopting a new DSS that supports moderately uncertain tasks because the hurdles of learning such a new DSS are likely to be overwhelming. Being in a positive mood can compensate for the hurdles of learning such a new system. Thus, people in a positive mood are more likely to perceive the new DSS as easy to use.

H2a: *Under moderate uncertainty, subjects' mood scores are positively related to subjects'* ***ease of use*** *scores. That is, the higher the mood scores of the subjects the higher their perceived ease of use scores.*

Being in a positive mood state not only promotes efficiency and thoroughness, but also creativity and innovation [48], where creativity is defined as the formation of unusual but useful associations [48, 61]. For example, people in a positive mood differ from their control counterparts in the associations they give to common words [26, 45, 48, 52]. They also categorize stimuli more inclusively, grouping more stimuli together [45, 50]. Moreover, they outperform their control counterparts in Dunker's Candle problem[2], a problem noted for requiring an innovative solution [48]. In terms of TAM, this ability may help users see non-obvious uses for the DSS, thus increasing perceived usefulness. Hence, we hypothesize that:

H2b: *Under moderate uncertainty, subjects' mood scores will be positively related to*

[2] In Dunker's Candle task, subjects are provided with a box of tacks, a candle and a book of matches. Subjects are then asked to attach the candle to a corkboard on the wall. Subjects must attach the candle to the corkboard in way that when the candle is burning it does not drip wax on the floor. The ability to solve this task depends on whether people can consider alternative uses for the objects they have at hand. For example, this problem can be solved by using the box of tacks as a candle holder, i.e., by emptying the box containing tacks and then attaching it to the corkboard with a tack to keep the candle upright. In other words, the problem is solved once an alternative use for the box that holds the tacks is identified [48].

*subjects' **usefulness** scores. That is, the higher the mood scores of the subjects the higher their perceived usefulness scores.*

Grounded in the positive mood theory [43] and prior IS research [20, 66], hypotheses H2a and H2b assert that being in a positive mood will influence the perceptions of ease of use and usefulness of a DSS that supports moderately uncertain tasks. According to positive mood theory, positive mood effects are due to cognitive effects and not due to response bias [43]. People in positive mood base their evaluations on careful and elaborate consideration of the problem at hand [26, 49]. They can integrate information even when it disconfirms their initial expectations [26]. Thus, we expect that people in positive mood choose to use a DSS only if it passes their elaborate cognitive assessments. In other words, the effects of positive mood on intention to use a DSS that supports moderately uncertain tasks will be mediated by the ease of use and usefulness of that DSS and not through a direct effect between positive mood and intention to use:

H2c: *Under moderate levels of uncertainty, the effect of **positive mood** on **intention to use** is mediated by **ease of use** and **usefulness**.*

As hypothesis H2c captures, the effects of positive mood on behavior, according to the positive mood theory, is not because happy people see "things through rose colored glasses" [43, p. 552], but rather they are able to carefully assess the situation. If positive mood effects were due to such a response bias (or halo effect), people in a positive mood would behave the same regardless of the nature of the task. A large body of studies, however, shows that this is not the case (for a review of these studies see [43]). For example, people in a positive mood do not rate the liking of an "enriched" vs. an "unenriched" task the same. We now turn to considering how positive mood effects might differ when individuals are faced with a highly uncertain task.

3.3. Does Positive Mood Change TAM Estimates under High Task Uncertainty?

While people in a positive mood rate neutral stimuli more favorably than people who are not in a positive mood, they do not rate extremely negative or extremely positive stimuli more or less favorably than their control counterparts [40]. Similarly, while people in a positive mood exhibit a greater desirability for moderately attractive outcomes, they do not show a greater desirability for an outcome that is extremely attractive or extremely unattractive [40]. That is, the effects of positive mood on behaviors depend on task characteristics and conditions. In particular, these studies suggest that positive mood effects on cognition are more likely to occur under moderate conditions, as opposed to extreme conditions [43]. Because the uncertainty level in our high uncertainty treatment is extremely high (55%), it is likely that positive mood effects do not take place at this level of uncertainty. Consequently, it is likely that people in a positive mood will behave similar to their control counterparts under a high level of uncertainty. Thus, while H1 proposed differences under moderate uncertainty, for the high uncertainty case we do not expect to detect differences between estimated TAMs in the two mood treatments, as stated in H3.

> ***H3:*** *Under high task uncertainty, TAM's relationships in the positive mood treatment will not differ from those in the control treatment.*

The above hypothesis (no positive mood effects under high uncertainty) along with H2a and H2b in the previous section imply that the effects of positive mood on ease of use and usefulness are moderated by the level of uncertainty in the task. Hence we propose the following:

> ***H4a:*** *The effect of **positive mood** on **ease of use** is moderated by task uncertainty.*

> ***H4b:*** *The effect of **positive mood** on **usefulness** is moderated by task uncertainty.*

4. Method

We tested our hypotheses using a laboratory experiment so as to have the necessary control over the task, uncertainty, and mood [72]. Our experimental design had two mood treatments (positive mood treatment and control group) and two task uncertainty treatments (moderate and high task uncertainty levels). Each subject was randomly assigned to one of the four treatment combinations. The planning task used in our study was embedded in a DSS that was introduced to subjects as a voluntary software tool being considered for use in several of their courses. Students were told that the DSS could be configured to support a variety of business decisions. None of the subjects had any prior experience with this DSS. Thus, the experimental setting provided a suitable context for measuring the effects of positive mood on acceptance of a new technology.

4.1. Task Description

The planning task used in our study was based on Holt, Modigliani, Muth, and Simon's [39] model of the production-scheduling problem. This task requires subjects to decide how many units to produce while considering uncertain future demand, current work force size, productivity, and inventory level. This problem is a realistic complex business task [66], appropriate for subjects, such as ours, with no prior experience with it [14, 76]. Laboratory studies typically add an error to the model to mimic the uncertainties of the real world in an experimental setting [e.g., 24, 62, 73, 74]. The following equation provides the model for the production-scheduling decision used in our study:

$$\begin{aligned}\text{Production Decision} = {} & b0 + b1 * (\text{work force last month}) - b2 * (\text{inventory on hand}) + \\ & b3 * (\text{the current month's demand}) + b4 * (\text{the demand for next month}) + b5 * \\ & (\text{the demand for two months ahead}) + e\end{aligned} \qquad (1)$$

The coefficients for this decision model, estimated for the production-scheduling decision at Pittsburgh Plate Glass [38, p.163], were b_0=148.5, b_1=1.005, b_2=0.464, b_3=0.464, b_4=0.239, and b_5=0.113. The DSS that supports this task provided subjects with production scheduling information, i.e., demand, inventory, and work force. To enter their production scheduling decision into the DSS, subjects adjusted a slider or used a scrollbar to set their desired value, and finalized their decisions by clicking the button "I am satisfied with my current decision." As customary in decision tasks designed for novice users, subjects received feedback after each decision, i.e., after entering their production value [14, 76]. This feedback included the actual decision (the production value generated by Equation 1) and percent error by which the subject's decision deviated from the actual decision. Subjects were provided with a history of their five most recent decisions, the corresponding actual decisions and percent errors. A button labeled "OK to Continue" started a new scheduling decision using a new set of scheduling information. Each new set of scheduling values was randomly generated.

Our production scheduling task consisted of 35 trials. The number of cues in the task determines the minimum number of trials necessary in a decision task [13, 73], with a "5 to 1" ratio (five trials per cue) recommended for tasks, such as this one, that have low or zero cue correlation [13, 73]. In our case, 25 trials (5 trials for each of the 5 cues) were required for statistically stable results. Since studies often add extra trials to the minimum required number of trials [20, 69], we added ten extra trials to the minimum number of trials required for our study.

4.2. Uncertainty Treatment and Measurement

The uncertainty level of a planning task is determined through its environmental predictability coefficient (Re). This Re coefficient is the correlation between the production decision without uncertainty and the production decision with uncertainty [13, p. 209], which differ only in an error term (e). As in prior research [20] we controlled the task's uncertainty level by manipulating the error term. We used two distinct error terms to create two distinct uncertainty levels, moderate uncertainty U_M and high uncertainty U_H, selected so that U_M is significantly less uncertain than U_H. We used a simulation and a pretest to determine and verify the two uncertainty levels. The details for these steps are provided below.

4.3. Simulation

To generate suitable uncertainty level values, we used simulation to generate error terms and their corresponding predictabilities (e, Re). From this set, we chose the error term, e=100 which has a predictability level Re=0.75 to create uncertainty level U_M. The predictability 0.75 is considered a moderate level of predictability [73]. Moreover, the error term, e=100, has been used in previous studies [24, 62, 73, 74, 76], and thus is a useful reference point. For the highly uncertain task, U_H, we selected a predictability level Re=0.55, which was generated by adding the error term e=188 to the task equation. A predictability 0.2 points lower than the U_M predictability of Re=0.75 was selected because performance significantly decreases when the predictability levels change by 0.2 points [64]. Furthermore, a task at this uncertainty level is only 55% predictable, representing a high uncertainty level [73].

4.4. Pretest

To verify that the uncertainty levels, U_M and U_H, were significantly different, we conducted a pretest. Forty-three subjects were randomly assigned to either uncertainty level U_M or uncertainty level U_H. Subjects' achievement was measured as the correlation between their decision values and the production decisions calculated from Equation 1, as recommended [13, p. 210]. As expected, the pretest results showed a significant decrease in achievement under the more uncertain task (Mean U_M =0.58, Mean U_H =0.34, t= 2.97, p=0.002). This confirmed that the two tasks were significantly different, i.e., the planning task with uncertainty level U_M was significantly more predictable than the one with uncertainty level U_H.

4.5. Mood Measurement

To measure positive mood (PM), we used scales (Table 2) that were validated and used in previous studies [24, 25, 28]. Subjects rated how accurately each of the words “glad”, “happy”, and “pleased” described their current mood. The ratings were on a seven-point scale with 1 denoting "strongly disagree", 4 denoting "neutral", and 7 "strongly agree, i.e., the higher the values of the PM score, the more positive the mood of the subject. As in previous work [20, 23], we found these items to be highly reliable (the reliability of this scale was greater than 0.90).

4.6. Acceptance Measurement

We measured perceived ease of use, perceived usefulness, and behavioral intention to use with scales (Table 2) validated and used in previous research [1, 21, 84]. Our test of internal reliability of the items confirmed previous research and showed a strong relationship among the survey items (all three scales had a reliability greater than 0.90). To ensure validity of acceptance measures in our task context, we told subjects that the DSS they were about to use was designed for use by students in their business courses and was being considered for the very course they were taking, as well as others.

4.7. Participants and Design

One hundred and thirty-four undergraduate business students (74 female, 60 male) in a major university volunteered to participate in the experiment. To encourage participation, subjects received extra credit in a course. Participants were first randomly assigned to the positive mood treatment or the mood control group, then randomly assigned to the moderate or the high task uncertainty treatment. Thus, the experimental design was two mood (positive and control) X two uncertainty (moderate and high) levels. A priori power analysis indicated that this sample size is sufficient for detecting a medium-sized effect with a power greater than 80% and a large-sized effect with a power greater than 95% [24].

4.8. Procedure

On the day of experiment subjects received a short tutorial on the task. Subjects were told that the

DSS used in this study was developed to help business students learn to make managerial decisions, and it was a voluntary tool being considered for adoption in their current and their other business courses. After the tutorial, we manipulated the mood of subjects who were randomly assigned to the positive mood treatment but did not manipulate the mood of subjects who were randomly assigned to the control treatment. As in prior research [20, 26], we manipulated mood by giving subjects a small bag of chocolate wrapped in colorful paper disguised as a token of our appreciation. Subjects in the control group, whose mood was not manipulated, did not receive a gift. To make sure that the control group did not learn about the surprise gift given to the positive mood group (i.e., to control for possible mood contamination), the experiment was conducted in two different sessions. First the control group completed the experiment and then the positive mood group.

Each subject received a randomly assigned seat number, which signified subjects' designated computers in the computer lab. Each computer in the lab was configured with a software package that included the DSS embedding either the task with the moderate level of uncertainty or the task with the high level of uncertainty. Thus, half of the subjects in each mood treatment (positive and control) were randomly assigned to the moderate and the other half to the high uncertainty treatment. The software package also included the mood and the TAM questionnaires. After entering their user id the software package instructed the subjects to complete the mood questionnaire. Next it directed them to the DSS. After using the DSS to make 35 decisions, the software package instructed the subjects to complete the TAM questionnaire. We designed the package so that subjects could not start the task before completing the mood questionnaire and could not start the TAM questionnaire before completing all 35 trials. The entire procedure did not exceed an hour.

5. Analysis

We tested our hypotheses using regression analysis. We used partial least squares (PLS) analysis [34] to calculate the extended TAM, i.e., TAM plus positive mood as an antecedent (Figures 1 and 2), as well as to compute statistics for demonstrating reliability and convergent validity (see Table 2).

5.1. Manipulation Tests

Before testing the hypotheses, the experimental manipulations of mood and uncertainty were verified using t-statistics to compare the mean of the mood scores in the mood treatment group to those in the control group and the mean of subjects' achievement in the moderate uncertainty group to those in the high uncertainty group. The results of the one tailed t-test showed that the mean of the mood scores of the subjects in the positive mood treatment was significantly higher than the mean of the mood scores of those in the control group ($\text{Mean}_{\text{Positive Mood Treatment}}=5.04$, $\text{Mean}_{\text{Control Group}}=4.65$, $t=1.99$, $p=0.02$), i.e., the mood manipulation was successful.

As in the pretest, we tested the uncertainty manipulation by comparing the achievement (i.e., the correlation between decision values calculated using the model in Equation 1 and decision values entered into the DSS by the subjects) of the subjects in the moderate and high uncertainty treatments [74, 75]. To rule out possible mood effects in this test, the comparison involved the achievement of subjects in the control group only (the group with no mood manipulation). The achievement of subjects in the moderate uncertainty treatment was significantly higher than the achievement of those in the high uncertainty treatment, tested using a one tail t-test ($\text{Mean}_{\text{Moderate Uncertainty Treatment}}=0.52$, $\text{Mean}_{\text{High Uncertainty Treatment}}=0.35$, $t=3.46$, $p<0.00$). That is, subjects' achievement was significantly better for the less uncertain planning task, verifying that the two task treatments were significantly different.

5.2. Reliability and Validity

First, each scale in this study was analyzed for reliability (Table 2). As recommended, all reliabilities were greater than 0.7 [9]. Next, we tested convergent and discriminant validity of our survey items – a test that requires 0.7 or larger for each construct's Average Variance Extracted (AVE) [29]. Moreover, the square root of each construct's AVE should be greater than the correlations shared between the construct and other model constructs [3]. The correlation matrix (Table 1) shows that these rules for discriminant validity are satisfied. Convergent validity can also be demonstrated when the loadings of items on their associated factors are greater than 0.5. The loadings data (Table 2) show that all of the constructs have significant loadings that load much higher than the suggested 0.5 threshold.

6. Results

The data used to test our hypotheses are summarized in Table 3, which shows the means and standard deviations for all the variables, for each of the four experimental conditions. Tables 4 and 7 provide regression models for each of the four experimental conditions.

6.1. Hypotheses Testing: DSS Acceptance Under Moderate Task Uncertainty

Hypothesis 1 predicts that TAM's relationships will differ between the two mood treatments. To examine this hypothesis, as in prior research [60], we estimated TAM for each mood treatment separately, using only the moderate uncertainty task, and compared the TAM estimates between the two treatments (see the regression models for the positive and control conditions in Table 4 and the summary results in Table 5). We used the method recommended by Rosenthal and Rosnow [70] to test the differences in p-values for each TAM relationship between the two treatments. Of the three relationships in the TAM model (PEU-PU, PEU-BI, PU-BI), the PU-BI relationship was significant and the PEU-BI relationship was not significant for both mood treatments. Neither of these relationships significantly differed between the two treatments. These results are consistent with prior TAM studies that do not find a significant relationship between PEU and BI and argue that the direct effect of PEU on BI in TAM is task dependent [53]. According to this argument, the lack of a significant PEU-BI relationship in our data is due to the planning task for which the DSS is being used.

Differences between the two mood treatments were apparent in the PEU-PU relationship, where the p-values significantly differ between the two treatments (p one-tail= 0.02). The PEU-PU relationship was significant in the control group, but lost its significance in the positive mood treatment. These results support Hypothesis 1.

The three parts of Hypothesis 2 (H2a, H2b, H2c) predict that positive mood affects PEU (H2a) and PU (H2b) but not BI under moderate uncertainty, i.e., the effects of positive mood on BI are mediated by PEU and PU (H2c). To test these hypotheses, we used an extended TAM which includes a positive mood variable as an antecedent of the TAM variables. Rather than treating positive mood as dichotomous (treatment or control), this model uses the positive mood measure, PM, to examine which TAM constructs are affected by positive mood. To test for the mediation proposed in H2c, we used the method described in Baron and Kenny [4]. Regression models for testing the mediation effect are shown in Table 6. In addition, Figure 1 shows the PLS results illustrating the extended TAM under a moderate uncertainty level.

Under moderate uncertainty, positive mood (PM) influenced a user's perception of ease of use (PEU) but not a user's perception of usefulness (PU). As expected, the effect of PM on users' intentions to use the DSS (BI) was mediated by PEU and PU. These results support H2a (a direct PM effect on PEU) and H2c (PM's effect on BI is mediated by PEU and PU), but not H2b (a direct PM effect on PU).

6.2. Hypotheses Testing: DSS Acceptance under High Task Uncertainty

Hypothesis 3 predicts that positive mood does not affect TAM's relationships under high uncertainty (in contrast to H1 that predicted significant differences under moderate uncertainty). To examine this hypothesis, as in the test for H1, we estimated TAM for each mood treatment and compared the models to see if their relationships differed (see the regression models for the positive mood and control conditions in Table 7, and the summary results in Table 8). For the control treatment, the TAM estimates are consistent with the results for the control treatment under moderate uncertainty (the same two relationships, PU-BI and PEU-PU, are significant), and thus are consistent with prior TAM studies that do not find a significant relationship between PEU and BI, provide further support for the argument that a significant PEU-BI relationship in TAM may depend on the type of task [31, 53].

For both the positive mood and the control treatment under high uncertainty, PEU-PU relationship was significant and the PEU-BI relationship was not significant. Neither of these relationships significantly differed between the two treatments. Although the PU-BI relationship is significant in the control group and not significant in the positive mood treatment, the p-values do not significantly differ between the two treatments. High uncertainty seems to have weakened the PU-BI relationship so that its p-value it is not quite significant, but it still does not differ significantly from the p-value for the control group [70]. We conclude that under high uncertainty, TAM does not differ between the control and mood treatment groups (see the summary in Table 8), which supports hypothesis H3.

Hypotheses 4a and 4b predict that the effects of positive mood on PEU and PU are moderated by task uncertainty. To test such a moderating effect we used the method described in Baron and Kenny [4], which examines the differences in the slopes of the regression models for PM-PEU and PM-PU between the two task treatments (see Tables 6 and 9 for these regression models). As expected, our results showed that the slope of regression models for PM-PEU was significantly different between the two uncertainly levels (p=0.04). Our results, however, did not show a significant difference between the slopes of PM-PU under the two uncertainly levels. The differences between the PM-PEU and PM-PU are also present in the extended TAM as estimated by PLS in Figures 1 and 2. Specifically, PM-PEU is significant under moderate uncertainty (Figure 1), but not under high uncertainty (Figure 2), whereas PM-PU is not significant in both cases. In examining the high uncertainty case (Figure 2), users' positive mood did not affect either PEU or PU. These results support H4a but not H4b.

7. Discussion

In this study, we examined whether being in a positive mood state affected the acceptance of a DSS that supported an uncertain task. We also checked for the possibility that the observed effects were due to response bias. Because we expected mood effects on DSS acceptance to differ for medium and high task uncertainty, we examined mood effects under each uncertainty level separately. As expected, our results show that positive mood affects TAM under the moderate uncertainty level, but not under the high uncertainty level. In addition, mood effects on DSS acceptance were not due to response bias.

These results are particularly important for several reasons. First, they are consistent with the findings of a recent TAM study that TAM does not hold under certain individual characteristics [60]. Second, our finding that TAM relationships were invariant under task uncertainty alone, but not when positive mood was induced, demonstrate the importance users' mild positive feelings might have on shaping their acceptance behavior. Finally, our results showing that positive mood effects were not due to response bias provide support for the need to include positive mood in DSS acceptance models. Our findings, which are summarized in Table 10, are discussed in the following paragraphs.

Because the enhanced cognitive capability of people in a positive mood allows them to see more varied aspects of stimuli and thus relate them differently, we expected positive mood to affect how

TAM's constructs were related under moderate uncertainty. As expected, TAM was affected by positive mood as evidenced by the differences in TAM's relationships in the two mood treatments. In particular, the only significant relationship in the positive mood treatment was PU-BI. These results indicate that at a moderate level of uncertainty, PEU predicted neither PU nor BI in the positive mood treatment. In other words, ease of use did not play a role in TAM for people in the positive mood treatment. These results are consistent with positive mood theory that suggests that people in a positive mood are better able to handle the hurdles of learning a new system.

The results of our study show that effects of positive mood on DSS evaluation was not due to response bias. Positive mood effects in our study did not result in indiscriminate ratings. Moreover, mood effects on TAM were not independent of task conditions as they did differ under moderate and high task uncertainty levels. These results are consistent with positive mood theory asserting that positive moods generally do not yield halo effects [47].

As expected, under a high level of uncertainty TAM relationships did not differ significantly between the two mood treatments. Our analysis, however, shows that PU is not a strong predictor of BI under high uncertainty for people in a positive mood. The non-significant PU-BI relationship is particularly interesting since this relationship is typically strong in TAM.

Contrary to what we predicted, positive mood (PM) affected only PEU, not both PEU and PU. There are several potential explanations for the lack of a positive mood effect on PU. First, because our experiment used a DSS designed to support the production planning task rather than using a general purpose system, there may have been fewer options for considering more creative uses for the DSS. Although we told subjects that the DSS could be configured for other decisions, they were likely focusing on the decisions at hand during their task. A general purpose IT, such as communication or office technologies, may provide a more sensitive medium for capturing the innovative tendencies of people in a positive mood. Second, the uncertainty of the task may have made the usefulness of the DSS questionable. Hence, despite their innovativeness, people in the positive mood may not have found the DSS more useful. This explanation is consistent with positive mood theory which suggests that people in positive mood are sensible and careful decision makers [41, 42]. Finally, positive mood theory may not apply to perceptions of DSS usefulness. Future research is needed to study these possible explanations.

8. Conclusions

8.1. Implications for Research and Practice

Our results have several important theoretical and practical implications. In general the results support cultivating "healthy caution about the generalizeability of the model" and in particular the need for including individual characteristics, such as positive mood, in TAM studies [60, p. 88]. They also provide further support for research that compares TAM estimates across different conditions to gain new clues about users' behavior. In particular, as shown in a recent study [60] as well as our study, such a method of analysis can serve as a useful tool for examining factors that affect TAM, i.e., the associations people see between ease of use, usefulness, and intention to use of an IT. The examinations of such associations can help to detect the nuances of acceptance behavior, hence refining our theoretical understanding of treatment effects on behavior. For example, our comparison of TAM's relationships between mood conditions suggests that acceptance of a DSS, for people in positive mood, may be explained more fully by cognitive variables other than ease of use and usefulness (e.g., variables capturing the association people see between the task and/or its characteristics and the DSS supporting it).

These results not only suggest that including affect in acceptance studies can expand our understanding of user behavior but also provide additional support for the need to include task characteristics and their potential effects in TAM studies [19, 56]. Moreover, our results suggest that future TAM studies examining positive mood should pay careful attention to the task and its characteristics. At a minimum, future TAM studies should control for positive mood and task characteristics. More generally, positive mood is only one of a variety of affect states, which are a subset of the individual characteristics that might affect TAM. Similarly, task uncertainty is only one of the many ways in which tasks are complex [8], and task complexity is only one of many potentially relevant task characteristics. Our results thus support the call for the examination of broader concepts such as affect and task characteristics in acceptance studies [56].

Our results showing no significant relationship between PEU and BI under both levels of uncertainty in the control group suggests that usefulness of a DSS that supports uncertain tasks may be more important in its adoption than its ease of use for people whose mood is not manipulated. From a practical point of view, these results suggest that targeted trainings that highlight the usefulness of such a DSS may be helpful in improving its acceptance.

Our results also show that under moderate uncertainty ease of use predicted neither usefulness nor intention to use. According to positive mood theory, people in a positive mood have a cognitive advantage over their counterparts and thus they would find learning a new system less overwhelming and thus less of an issue in their adoption decision. These results suggests that managerial interventions such as fostering positive mood states before training sessions may be beneficial for reducing the hurdles of learning a new DSS that supports moderately uncertain tasks. Because simple accommodations such as a pleasant work environment can enhance employees' mood, managers can facilitate a positive mood by providing refreshments, comfortable chairs, and a pleasant room for training sessions [46].

Our result – that people in a positive mood may base their adoption decision on cognitive factors other than those suggested in TAM (i.e., ease of use and usefulness) – should not be interpreted to mean that practitioners can use chocolate to influence potential users instead of developing easy-to-use interfaces and useful system features. Because people in a positive mood are careful evaluators, they most likely will not appreciate working with a DSS that has a cumbersome interface or poorly designed features. Thus, they would most likely refuse to adopt such a DSS as any other rational actor would. A more meaningful interpretation of this result is that manipulating software features to increase usefulness or manipulating interfaces to facilitate ease of use might not be enough to foster intention to use a DSS for people in a positive mood. Because positive moods are common [28, 40] and desirable in organizational settings [5], our results call for scientific examination of other factors (such as task) that are likely to affect acceptance behaviors of people in a positive mood. Designers must also pay close attention to the characteristics of the task for which a DSS is designed to support.

Finally, the results showing that positive mood did not affect all TAM constructs equally and/or under both task conditions supports the argument that the effects of positive mood on DSS acceptance were due to its effect on cognition, not due to people in a positive mood wearing “rose color glasses” [30, 47, 52]. These results highlight the important role affect plays in better understanding acceptance behavior. As our results show, without considering positive mood, we would have concluded that under both uncertainty levels users’ intention to use the DSS was explained by their perception of how useful the DSS was, which in turn was explained by perceived ease to use of the DSS. When positive mood was considered, however, our results presented a different picture under each uncertainty level. Under moderate uncertainty, ease of use did not have any significant association with the other TAM constructs for people in positive mood. Under high uncertainty, PU became a weak predictor of BI. Hence including positive mood provided a more comprehensive picture of acceptance behaviors.

8.2. Limitations and Future Research

Laboratory experiments provide a suitable setting for controlling, manipulating, and measuring experimental variables [72, 76]. With a laboratory experiment, we could investigate the effects of mood on acceptance in a theoretically sound way, e.g., we could control the uncertainty levels used and we could study mood effects without the effect of variables such as power and/or politics that are present in organizational settings [72]. Using student subjects provided more control over the effects of experience.

With laboratory experiments, however, the generalizability of the results beyond their setting and task is difficult to assess. We reduced the threats to external validity by designing the experimental setting to capture relevant aspects of real decision tasks by using a task identified as complex and realistic [66]. Moreover our task was calibrated with real world data, and we made sure that the experiment was realistic and relevant for our subjects. Despite these efforts, future research should be conducted to test the extent to which our results generalize beyond our particular subject population and task. For example, since our subjects were senior undergraduate business students who would enter the job market soon, our results are applicable to new employees entering the work force [6], but they might not be applicable to more experienced employees. Similarly, while we characterized our task conditions in terms of their uncertainty levels, one still needs to test whether other tasks with the same uncertainty levels produce similar results. Such research might also examine subjects' sensitivity to task uncertainty levels in environments other than laboratory settings. Since the effects of positive mood on cognition are robust across different settings and different populations [47], we conjecture that the enhancing effects of positive mood on the perception of IT ease of use should generalize to subjects, tasks, settings, and systems beyond the ones used in our study. Future research, nevertheless, is needed to investigate other subjects, tasks, settings, and systems to generalize these results to broader contexts.

Furthermore, while we followed the TAM and its focus on intention to use, this study should also be extended to examine the effects of mood on actual use rather than intention to use. We argued that positive mood affects behavioral intention because of its effect on cognition. That is, people in positive mood will make the decision to use a DSS or not based on careful evaluation not because of halo effects [30, 47, 52]. Since our results support this argument it is likely that adoption behavior operationalized as usage will also generate similar results; nevertheless future experiments must verify this argument.

While examining the long term effects of positive mood on adoption of a DSS was beyond the scope of our study, it is surely an important issue that calls for future research. While positive mood is a temporary state, there is evidence that it can affect more stable conditions. For example, a recent study found that positive mood influences the attitudes of health care professionals towards a telemedicine system as much as the usefulness of the system [22]. Such a change in attitudes is likely to result in long term effects. Another study suggests that positive moods are likely to mitigate the undesirable long term effects of negative moods on adoption decisions [77]. Thus, the effects of positive mood over the long term is likely to be an important avenue for future research.

According to decision making literature [73], the uncertainty levels used in this study were moderate and high. Future research could, however, extend our findings by testing the sensitivity of the results to changes in the moderate and/or high uncertainty levels in the task used. Additionally, our study can be extended to include user perceptions of task uncertainty. While typically IS studies that use this task do not ask their subjects how uncertain they thought the task was, such additional data may be particularly useful in providing more insight about the effects of positive mood on DSS adoption under various levels of uncertainty.

8.3. Summary

In this study we examined the effects of positive mood on acceptance of a DSS under two levels of task uncertainty. Under a moderate uncertainty level for both the positive and control mood treatments, people related usefulness of the DSS to their intention to use it. Under moderate uncertainty, people in a positive mood, unlike their control counterparts, did not think that ease of use was a major issue in deciding whether or not to use the DSS. Under high uncertainty, usefulness became a weaker predictor of intention to use for people induced with positive mood. Moreover, consistent with the positive mood theory, the observed positive effects were due to cognitive evaluation of the DSS and the task at hand, not to halo effects. Our results are consistent with the literature [6, 8, 33, 41, 68] suggesting that including affective states in formal models can provide a more complete view of human behavior. Our results are also consistent with those acceptance studies that argue internal processes are essential in understanding user behavior [64-66]. Because rational decisions cannot be made in absence of affect [3, 4, 19], and because DSS adoption is a rational choice, investigating the role affect plays in acceptance behavior and the conditions under which affect becomes significant (and/or influences behavior favorably or unfavorably) becomes not only a logical but also a necessary direction for future acceptance studies.

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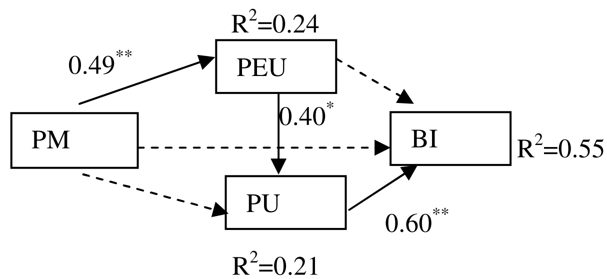
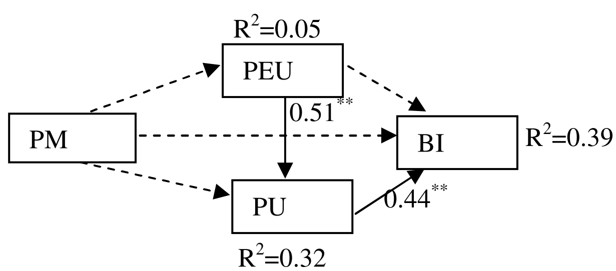
Figures and Tables



*Solid lines represent significant paths while dashed lines represent paths that are not significant; * signifies p-values less than 0.05;** signifies p-values less than 0.01.*

Figure 1: Extended TAM under Moderate Task Uncertainty



*Solid lines represent significant paths while dashed lines represent paths that are not significant; * signifies p-values less than 0.05;** signifies p-values less than 0.01.*

Figure 2: Extended TAM under High Task Uncertainty

Table 1: Latent Variable Correlations and Discriminant Validity

	Positive Mood	Perceived Ease of Use	Perceived Usefulness	Intention to Use
Positive Mood	**0.92**			
Perceived Ease of Use	0.31	**0.87**		
Perceived Usefulness	0.27	0.50	**0.93**	
Intention to Use	0.25	0.49	0.63	**0.96**

Diagonal elements in the above matrix are the square root of Average Variance Extracted. As required for discriminant validity, each of these diagonal elements is greater than the correlations shared between the construct and other model constructs, that is, greater than the figures in the same row and the same column.

Table 2: Questionnaire Items† and Convergent Validity

Construct: **Positive Mood** Instruction: Please describe your current mood. For each item below, please choose the number that describes best the way you are feeling right now.				
Reliability= 0.94	**Mean**	**Std. Dev.**	**Loading**	**t-stat**
Glad	2.46	2.28	0.92	55.26***
Happy	4.91	1.22	0.93	55.03***
Pleased	4.78	1.18	0.90	25.31***
Source of items [20]				
Construct: **Perceived Ease of Use** Instructions: On a scale of 1 to 7 rate the following questions for the Interactive Decision Support System (IDSS) that you just finished working with.				
Reliability=0.93	**Mean**	**Std. Dev.**	**Loading**	**t-stat**
Learning to operate the Interactive Decision Support System was easy for me.	5.26	1.60	0.86	26.27***
I find it easy to get the Interactive Decision Support System to do what I wanted it to do.	5.08	1.42	0.89	37.07***
It was easy for me to become skillful at using the Interactive Decision Support System.	5.15	1.57	0.86	28.69***
I found the Interactive Decision Support System easy to use.	4.80	1.55	0.86	23.50***
Source of items [1]				
Construct: **Perceived Usefulness** Instructions: On a scale of 1 to 7 rate the following questions for the Interactive Decision Support System (IDSS) that you just finished working with.				
Reliability=0.96	**Mean**	**Std. Dev.**	**Loading**	**t-stat**
Using the Interactive Decision Support System enhances my effectiveness in college.	4.27	1.35	0.95	88.37***
Using the Interactive Decision Support System enhances my productivity.	4.23	1.39	0.92	44.73***
Using the software that I just worked with can be useful in my college activities.	4.90	1.31	0.92	65.01***
Using the Interactive Decision Support System improves my performance in college.	4.31	1.35	0.93	47.61***
Source of items [1]				
Construct: **Behavioral Intention to Use** Instructions: Please rate your willingness to use the Interactive Decision Support System by answering the following questions.				
Reliability=0.98	**Mean**	**Std. Dev.**	**Loading**	**t-stat**
Assuming that I had access to the Interactive Decision Support System I intend to use it.	4.72	1.25	0.97	110.81***
Given that I had access to the Interactive Decision Support System I predict that I would use it	4.75	1.25	0.96	95.52***
I expect to use the Interactive Decision Support System when it becomes available.	4.46	1.20	0.95	66.29***
Source of items [1]				

*†All items were measured using a seven-point Likert scales with 1 denoting strongly disagree and 7 denoting strongly agree. *** signifies p-values less than 0.001 level (p <0.001).*

Table 4: Regression Models for TAM under Moderate Task Uncertainty

	Dependent Variable	Independent Variable	Standardized Coefficient	t-Value	P-value
Control (no mood manipulation)	BI	PEU	0.58	3.86	0.001
		Overall model $F = 14.91$; $p = 0.001$; $R^2 = 0.34$; adjusted $R^2 = 0.32$			
	BI	PU	0.78	6.62	0.000
		Overall model $F = 43.84$; $p = 0.000$; $R^2 = 0.60$; adjusted $R^2 = 0.58$			
	PU	PEU	0.64	4.52	0.000
		Overall model $F = 20.33$; $p = 0.000$; $R^2 = 0.41$; adjusted $R^2 = 0.39$			
	BI	PEU	0.14	0.94	0.360
		PU	0.68	4.46	0.000
		Overall model $F = 22.28$; $p = 0.000$; $R^2 = 0.61$; adjusted $R^2 = 0.59$			
Positive mood	BI	PEU	0.28	1.63	0.110
		Overall model $F = 2.65$; $p = 0.11$; $R^2 = 0.08$; adjusted $R^2 = 0.05$			
	BI	PU	0.65	4.82	0.000
		Overall model $F = 23.25$; $p = 0.000$; $R^2 = 0.42$; adjusted $R^2 = 0.4$			
	PU	PEU	0.19	1.07	0.290
		Overall model $F = 1.15$; $p = 0.29$; $R^2 = 0.04$; adjusted $R^2 = 0.004$			
	BI	PEU	0.16	1.18	0.250
		PU	0.62	4.55	0.000
		Overall model $F = 12.5$; $p = 0.000$; $R^2 = 0.45$; adjusted $R^2 = 0.41$			

Table 5: Differences in Regression Coefficients and their p-values for TAM Between Mood Treatments under Moderate Task Uncertainty

Model Relationship	Positive Mood Regression Coefficient Significance	Control Regression Coefficient Significance	Significant Differences in p values
PEU – PU	No	Yes	Yes
PEU – BI	No	No	No
PU – BI	Yes	Yes	No

PEU: Perceived Ease of Use, PU: Perceived Usefulness, BI: Behavioral Intention to Use.

Table 6: Regression Models for Moderate Uncertainty

Dependent Variable	Independent Variable	Standardized Coefficient	t-Value	P-value
BI	PM	0.40	3.46	0.001
	Overall model F = 11.97; p= 0.001; R^2 = 0.16; adjusted R^2 = 0.15			
PU	PM	0.30	2.48	0.016
	Overall model F = 6.15; p = 0.016; R^2 = 0.09; adjusted R^2 = 0.08			
PEU	PM	0.48	4.37	0.000
	Overall model F = 19.05; p = 0.000; R^2 = 0.23; adjusted R^2 = 0.22			
PU	PEU	0.41	3.67	0.001
	PM	0.21	1.87	0.070
	Overall model F = 10.10; p = 0.000; R^2 = 0.25; adjusted R2 = 0.22			
BI	PEU	0.13	1.20	0.230
	PU	0.58	5.98	0.000
	PM	0.16	1.61	0.114
	Overall model F = 22.01; p = 0.000; R^2 = 0.52; adjusted R2 = 0.50			

Table 7: Regression Models for TAM under High Task Uncertainty

	Dependent Variable	Independent Variable	Standardized Coefficient	t-Value	P-value
Control (no mood manipulation)	BI	PEU	0.48	2.95	0.006
		Overall model F = 8.71; p= 0.006; R^2 = 0.23; adjusted R^2 = 0.20			
	BI	PU	0.59	3.96	0.000
		Overall model F = 15.67; p = 0.000; R^2 = 0.35; adjusted R^2 = 0.33			
	PU	PEU	0.48	2.94	0.006
		Overall model F = 8.66; p = 0.006; R^2 = 0.23; adjusted R^2 = 0.20			
	BI	PEU	0.25	1.53	0.140
		PU	0.47	2.82	0.009
		Overall model F = 9.37; p = 0.001; R^2 = 0.40; adjusted R^2 = 0.36			
Positive Mood	BI	PEU	0.17	0.97	0.340
		Overall model F = 0.93; p = 0.342; R^2 = 0.027; adjusted R^2 = 0.002			
	BI	PU	0.33	2.01	0.053
		Overall model F = 4.03; p = 0.053; R^2 = 0. 11; adjusted R^2 = 0.08			
	PU	PEU	0.39	2.44	0.020
		Overall model F = 5.95; p = 0.02; R^2 = 0. 15; adjusted R^2 = 0.12			
	BI	PEU	0.01	0.03	0.970
		PU	0.33	1.81	0.080
		Overall model F = 1.95; p = 0.16; R^2 = 0. 11; adjusted R^2 = 0.053			

Table 8: Differences in Regression Coefficients and their p-values for TAM Between Mood Treatments under High Task Uncertainty

Model Relationship	Positive Mood Regression Coefficient Significance	Control Regression Coefficient Significance	Significant Differences in p values
PEU – PU	Yes	Yes	No
PEU – BI	No	No	No
PU – BI	No	Yes	No

PEU: Perceived Ease of Use, PU: Perceived Usefulness, BI: Behavioral Intention to Use.

Table 9: Regression Models for High Uncertainty

Dependent Variable	Independent Variable	Standardized Coefficient	t-Value	P-value
PU	PM	0.20	1.642	0.11
	Overall model F = 2.70; p = 0.11; R^2 = 0.04; adjusted R^2 = 0.03			
PEU	PM	0.11	0.90	0.37
	Overall model F = 0.82; p = 0.37; R^2 = 0.01; adjusted R^2 = 0.003			

Table 3: Descriptive Statistics

		Induced Positive Mood	Control Group
Moderate Uncertainty	PM	4.95 (0.94)	4.76 (1.15)
	PEOU	5.48 (0.99)	4.35 (1.05)
	PU	4.09 (1.31)	4.31 (1.05)
	BI	4.96 (1.09)	4.76 (1.11)
		N=35	N=31
High Uncertainty	PM	5.11 (1.21)	4.55 (1.07)
	PEOU	5.28 (1.47)	4.96 (1.51)
	PU	4.35 (1.12)	3.81 (1.35)
	BI	4.76 (1.35)	4.33 (1.26)
		N=36	N=32

PM: Positive Mood, PEOU: Perceived Ease of Use, PU: Perceived Usefulness, BI: Behavioral Intention to Use. Statistics in each cell are Mean and (Standard Deviation). N represents the number of Subjects in each Treatment.

Table 10: Summary of Hypotheses

	Hypothesis for the moderate uncertainty level	
H1.	***TAM's relationships*** *in the positive mood treatment will differ from those in the control treatment.*	Supported
H2a.	*Subjects' mood scores will be positively related to subjects'* ***ease of use*** *scores.*	Supported
H2b.	*Subjects' mood scores will be positively related to subjects'* ***usefulness*** *scores.*	Not Supported
H2c.	*The effect of* **positive mood** *on* **intention to use** *is mediated by* **ease of use** *and* **usefulness**.	Supported
	Hypothesis for the high uncertainty level	
H3.	***TAM's relationships*** *in the positive mood group will not differ from those in the control group.*	Supported
H4a.	*The effect of* **positive mood** *on* **ease of use** *is moderated by the task.*	Supported
H4b.	*The effect of* **positive mood** *on* **usefulness** *is moderated by the task.*	Not Supported