

# Computer Technology Training in the Workplace: A Longitudinal Investigation of the Effect of Mood

Viswanath Venkatesh

*The Robert H. Smith School of Business, University of Maryland*

and

Cheri Speier

*Eli Broad College of Business, Michigan State University*

---

**How does a person's mood during technology training influence motivation, intentions, and, ultimately, usage of the new technology? Do these mood effects dissipate or are they sustainable over time? A repeated-measures field study ( $n = 316$ ) investigated the effect of mood on employee motivation and intentions toward using a specific computer technology at two points in time: immediately after training and 6 weeks after training. Actual usage behavior was assessed for 12 weeks after training. Each individual was assigned to one of three mood treatments: positive, negative, or control. Results indicated that there were only short-term boosts in intrinsic motivation and intention to use the technology among individuals in the positive mood intervention. However, a long-term lowering of intrinsic motivation and intention was observed among those in the negative mood condition.** © 1999

Academic Press

---

You spent a wonderful week in Hawaii. You are upbeat. You return to work for an important executive technology training program. Alternatively, you had an argument with your spouse. Your typical 20-min commute took over an hour due to bad traffic. You reach work and head straight for an important executive training program on a new computer software application. Will your mood, altered by either of these two highly plausible scenarios, affect your

Address reprint requests to Cheri Speier, Eli Broad College of Business, Michigan State University, N215 North Business Complex, East Lansing, MI 48824. Fax: (517) 432-1101. E-mail: [cspeier@pilot.msu.edu](mailto:cspeier@pilot.msu.edu).

motivation and intentions related to the new technology? Further, will the positive or negative mood state at the time of training influence your long-term motivation and intentions?

One could argue that everyone is always in "some sort of mood." From a practical perspective, events in one's day-to-day activities, including those that occur in the workplace, can trigger or sway people's moods into more positive or negative mood states (Cervone, Kopp, Schaumann, & Scott, 1994; Clark & Watson, 1988; George & Jones, 1996; Isen & Levin, 1972). Even small events (e.g., finding change in a telephone booth) are sufficient to generate mood effects that influence individual's perceptions and actions (Isen, Shalke, Clark, & Karp, 1978). Such moods typically influence an individual's behavior in a wide variety of contexts (e.g., Bower, 1991; Clark & Isen, 1982; Forgas, 1995).

From a training perspective, employees participating in a specific training session would likely be in very different moods and these moods might differentially influence training outcomes. However, the role and effects of employee mood in organizational training situations have been overlooked as have long-term effects of mood. This research addresses the gap in organization behavior literature by presenting a longitudinal investigation of how positive, negative, or neutral employee moods during technology training influence motivation to use that technology. This question is of critical importance given that computer technologies have become pervasive in today's workplace, and organizations spend about \$20B each year on computer training (Industry Report, 1996). Unfortunately, there is growing evidence of unrealized or less than expected productivity gains due to poor user acceptance of new technologies (Keil, 1995; Swanson, 1988). Employee computer training has been identified as a necessary and essential component of individual and organizational computing success to counteract existing acceptance problems (Tannenbaum, 1990; White & Christy, 1987). While research investigating issues influencing effective computer training have begun to proliferate (Compeau & Higgins, 1995; Martocchio, 1994; Mitchell, Hopper, Daniels, George-Falvy, & James, 1994; Venkatesh, in press; Venkatesh & Davis, 1996), the effects of mood on training have yet to be fully investigated.

### **INFLUENCE OF MOOD ON MOTIVATION TO USE COMPUTER TECHNOLOGY**

Motivation has been identified as a key determinant of behavior in a wide variety of domains (Deci & Ryan, 1985). Two broad classes of motivation—*intrinsic* and *extrinsic*—have been defined and examined across a variety of contexts and studies (Deci, 1971; Deci & Ryan, 1985; see Vallerand, 1997, for a review). *Intrinsic* motivation refers to the pleasure and inherent satisfaction derived from a specific activity (Deci, 1975; Vallerand, 1997), while *extrinsic* motivation emphasizes performing a behavior because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity such as increased pay and improved job performance (Lawler & Porter, 1967;

Vroom, 1964). Such intrinsic and extrinsic motivation together influence an individual's intention to perform an activity as well as actual performance (Deci, 1975).

In the context of technology, Davis, Bagozzi, and Warshaw (1992) tested a motivational model of technology usage. Consistent with prior research investigating other behaviors, they found that extrinsic and intrinsic motivation were key drivers of an individual's intention to perform the behavior (i.e., technology usage), a construct that has been linked closely with actual behavior (see Ajzen, 1991; Sheppard, Hartwick, & Warshaw, 1988; Taylor & Todd, 1995). Davis et al. (1992) conceptualized and operationalized extrinsic motivation to use a specific technology in the workplace by relating it to performing job-related activities more productively. Individuals are often rewarded for good and productive behavior with raises, bonuses, etc. (Pfeffer, 1983; Vroom, 1964). Therefore, if a technology is perceived to be useful in facilitating the individual's productivity, she/he is likely to have extrinsic motivation to use a given technology (Davis, 1989; Davis et al., 1992; Robey, 1979). Alternatively, if a technology is not perceived as useful, it will offer the individual no advantages and possibly disadvantages in performing their work, thereby inhibiting their ability to perform their job and obtain rewards (Davis, Bagozzi, & Warshaw, 1989).

In addition to perceived productivity gains from using a technology, some individuals may have intrinsic motivation to interact with technologies. Such intrinsic motivation was conceptualized and operationalized by Davis et al. (1992) as perceived enjoyment—the extent to which using a computer is perceived to be enjoyable distinct from any performance outcomes that might be obtained (see also Carroll & Thomas, 1988; Deci, 1971; Malone, 1981a). Empirical support for enjoyment as a determinant of behavioral intentions to use a specific technology has been demonstrated for both computer games (Holbrook, Chestnut, Oliva, & Greenleaf, 1984; Malone, 1981) and for computer technology in the workplace (Davis et al., 1992).

While there is empirical support for the motivational model of technology usage (Davis et al., 1992), little is known about the underlying factors influencing extrinsic and intrinsic motivation, the key drivers of technology usage. Specifically, we examine how employee mood, a state variable, at the time of initial training on a new technology influences her/his motivation to use a new technology. Further, from the perspective of motivation and mood research, little is known about the long-term effects of motivation on technology usage behavior. To address this, the current work presents an investigation of employee mood at the time of training on long-term motivation, intention, and behavior. Thus, this research aims to further our understanding of technology usage behavior in general and the work of Davis et al. (1992) in the following three ways: (a) examining the role of an external variable (i.e., mood) in the motivational model of Davis et al. (1992), (b) studying the role of motivation as it influences technology usage in the long run, and (c) understanding potential long-term effects (on technology usage behavior) of the mood that was salient at the time of initial training on the new technology.

### *General Mood Research*

Mood refers to how people feel when they are engaged in any number of activities (George & Jones, 1996). Mood has been examined as both a state and a trait (see George, 1989, 1991) and in this research, mood is examined as a state variable. Prior research has identified a breadth of specific moods (e.g., sadness, fear, arousal, elation) (Russell & Mehrabian, 1977; Watson & Tellegen, 1985) and a strong theoretical basis exists for categorizing these diverse mood states into either positive or negative affect (Clark & Isen, 1982; Osgood & Suci, 1955; Schwarz & Clore, 1988).

Research assessing the influence of mood on judgment, motivation, and performance has branched into two paths—resource allocation (see Ellis & Ashbrook, 1988, for a review) and associative network models (Bower, 1981; Clark & Isen, 1982; Isen, 1984). The distinction between these paths relates to some extent on the manner in which mood interacts with cognitive processing. The resource allocation perspective suggests that moods can actually interfere with cognitive processing while the associative network model perspective suggests that mood provides a context in which cognitive processing is performed. There is empirical support for both perspectives and they may be complementary in nature (Kihlstrom, 1991). Proponents of the resource allocation path suggest that individuals have limited attentional resources and any affective state, including positive or negative moods, requires the expenditure of limited resources, decreasing the resources available for information processing (Ellis & Ashbrook, 1988; Hasher & Zacks, 1979). Although both positive and negative moods influence resource allocation, these different affective states are believed to influence resource allocation in different ways.

Individuals in positive moods expend some resources “enjoying” their mood and therefore reduce the amount of extensive information processing and engage in heuristic processing where positive information cues are particularly salient (Asuncion & Lam, 1995). With respect to negative moods, the influence on attentional resource availability is also particularly deleterious as individuals with negative moods are more likely to concentrate on their current negative mood state (Ellis & Ashbrook, 1988) and significantly limit the resources available for processing. Negative moods have resulted in reduced information recall (Ellis, Thomas, McFarland, & Lane, 1985), higher performance expectations placed upon oneself (Cervone et al., 1994), reduced task processing (Oaksford, Morris, Grainger, & Williams, 1996), and less favorable evaluations (Curren & Harich, 1994). Thus, there is mood-congruent recall of information where those in positive moods recall positive information and those in negative moods recall negative information.

An alternative perspective, the associative network model (Bower, 1981), proposes that moods are stored as nodes in memory just as information content is stored in memory nodes. When new information is learned or processed, it is associated with the nodes that are active at the time of learning, linking these content and affective state nodes together. When content that has been associated with a specific affective state is retrieved from memory, so too is

the affective state, resulting in an ongoing association between the affective state and content (Bower, 1991; Curren & Harich, 1994; Forgas, 1995).

How is a positive or negative mood state during training likely to influence employee motivation to use a specific computer technology? Vallerand (1997) suggests that individual situational or social factors (i.e., “human and non human factors found in our social environment . . . and variables that are present at a given point in time but not on a permanent basis”) (Vallerand, 1997, p. 295) influence motivation to perform a variety of activities. Mood fits this situational role as it is a pervasive, yet nonenduring state (Swinyard, 1993). Although mood itself is not enduring, it is possible that the effects of mood on subsequent behavior may have both short- and long-term implications (Curren & Harich, 1994).

### *Short-Term Mood Effects*

Specific to computer technology training, an individual's perception of enjoyment of technology use (i.e., intrinsic motivation) is likely to be influenced by mood. Positive moods result in more favorable assessments of one's abilities (Martin, Ward, Achee, & Wyer, 1993; Schwarz & Bohner, 1996) and enhanced perceptions of confidence (Forgas, 1991), thus potentially increasing perceptions of enjoyment and thereby intrinsic motivation. Additionally, individuals in positive moods tend to use heuristic (as opposed to analytical) processing (Worth & Mackie, 1987), resulting in increased creativity and playfulness (Isen, 1984; Schwarz & Bless, 1991), leading to greater task enjoyment (Carson & Adams, 1980) and thus greater intrinsic motivation. In general, positive moods have been shown to enhance perceptions of a given task and satisfaction (Brief, Butcher, & Roberson, 1995; Kraiger, Billings, & Isen, 1989) likely resulting in increased intrinsic motivation (George & Brief, 1996).

In contrast, individuals in a negative mood state may be less motivated to perform well in demanding tasks (Kihlstrom, 1989; Pavelcheck, Antil, & Munch, 1988; Schaller & Cialdini, 1990), in part because they must allocate some of their limited attentional resources to repairing their mood (Ellis, Ottaway, Varner, Becker, & Moore, 1997). Negative moods also result in more pessimistic assessments regarding oneself and the adequacy of existing knowledge, and other relevant aspects of the situation including external resources (Forgas, Bower, & Moylan, 1990; Schwarz & Bonner, 1996; Weary & Gannon, 1996). This negative assessment generates uncertainty and/or lack of confidence in one's ability and can result in a negative judgment towards a given situation (Weary & Gannon, 1996). Therefore:

H1(a): Individuals in positive mood states have greater intrinsic motivation to use a new computer technology than individuals in neutral moods.

H1(b): Individuals in negative mood states have less intrinsic motivation to use a new computer technology than individuals in neutral moods.

Just as mood is hypothesized to influence intrinsic motivation, mood can also influence extrinsic motivation. Specific to training, mood can influence

learning and information processing as an individual in a positive mood learns and recalls positive details associated with the material more effectively and is more likely to make more a positive attribution regarding ambiguous information (Bower, 1991; Erber, 1991; Forgas, 1992, 1995). These positive attributions are likely to result in individuals recognizing greater value in using the technology specific to the technology's usefulness and increased productivity associated with their job. Additionally, individuals in positive moods apply more creativity (Schwarz & Bless, 1991) to their processing and are therefore, more likely to see more subtle ways of using the technology to enhance their productivity.

In contrast, individuals in a more negative mood are more likely to make negative attributions regarding the technology's usefulness and its ability to increase their productivity and rewards. Similarly, these individuals perform more analytical, detailed-oriented processing (i.e., mood avoidance) increasing their procedural knowledge. However, their logical reasoning is characterized by limited originality, creativity, and playfulness (Schwarz & Bless, 1991). With respect to training, this is likely to result in individuals who understand how to make the technology perform specific functions, but who have limited insights into how to use the technology to improve their personal productivity (e.g., less ability to apply the acquired knowledge into domain specific requirements). Therefore:

H2(a): Individuals in positive mood states have greater extrinsic motivation to use a new computer technology than individuals in neutral moods.

H2(b): Individuals in negative mood states have less extrinsic motivation to use a new computer technology than individuals in neutral moods.

Although there is strong empirical support for the relationship between intrinsic/extrinsic motivation and intention to perform an activity (e.g., use a technology) (Davis et al., 1992; Kruglanski, Friedman, & Zeevi, 1971; Vallerand, Fortier, & Guay, 1997) and actual behavior (Deci & Ryan, 1985; Vallerand & Bissonnette, 1992; Vallerand, Fortier, & Guay, 1997), the nature of the relationship varies based on the motivational forces specific to the behavior at hand. For example, Deci (1971, 1975) indicated an interactive effect exists between extrinsic and intrinsic motivation on intention where introducing or increasing extrinsic motivation decreases intrinsic motivation for tasks that were originally purely motivated from an intrinsic perspective. However, for behaviors that are not purely intrinsic in the first place, extrinsic and intrinsic motivation play an additive role in explaining intentions and behavior (Calder & Staw, 1975; Hirst, 1988; Mossholder, 1980).

In prior technology adoption and usage research, the additive role of extrinsic and intrinsic motivation as determinants of computer usage in the workplace has been theoretically justified and empirically demonstrated by Davis et al. (1992). The earlier mood-congruent hypotheses (H1(a), H1(b), H2(a) and H2(b)) suggested that positive mood will increase while negative mood will decrease both intrinsic and extrinsic motivation to use a technology. Given the additive

role of extrinsic and intrinsic motivation for workplace computing, it follows that intention should also follow this mood-congruent pattern. Therefore:

H3(a): Individuals with positive moods will have greater intention to use a technology than individuals with neutral moods.

H3(b): Individuals with negative moods will have lower intention to use a technology than individuals with neutral moods.

In sum, in the short term, positive mood is expected to enhance both intrinsic and extrinsic motivation and the resulting intention to use the new technology. In contrast, negative mood is expected to depress both intrinsic and extrinsic motivation, thus lowering intention to use the new technology.

### *Long-Term Mood Effects*

If mood can influence motivation at the time of training and immediate recall, are these effects sustainable? The evidence on this topic is equivocal and may be highly dependent on the specific tasks, materials, and activities (Bower, 1987; Eich, Macaulay, & Ryan, 1994; Kihlstrom, 1989). There is evidence that mood dependent effects exist only over short periods of time (Eich et al., 1994; Vallerand, 1997). However, Curren and Harich (1994) demonstrated that mood can have long-lasting effects on evaluations and judgments. Grounding their findings in the associative network model perspective, when an individual retrieves information regarding a specific activity (e.g., enjoyment or usefulness of a technology), she/he will also unconsciously retrieve information associated with her/his mood at the time this information was encoded.

Specific to negative moods, Leight and Ellis (1981) indicated that individuals in negative moods exhibited inhibited recall performance in immediate and longer term (i.e., separated by a minimum of 24 h) assessments. Importantly, the long-term inhibited recall performance (among those who were in a negative mood at the time of initial encoding of the information) was observed despite the induction of an elated or neutral mood immediately before measurement of performance in the long term. Therefore, it would appear that the initial negative mood resulted in an inefficient or inappropriate processing strategy that became increasingly inflexible and rigid during succeeding training periods resulting in impaired long-term performance. Developing an inefficient or inflexible information processing strategy at the time of initial training is difficult to overcome, as it affects one's perceptions of intrinsic motivation regarding engaging in an activity such as computer use. Even with additional training and repeated use as seen in Leight and Ellis (1981), the initial perceptions formed may be too instantiated to overcome with direct experience.

The importance of developing effective processing during initial exposure and learning has strong corollaries to intrinsic motivation. For example, higher levels of intrinsic motivation developed during the early stages of learning lead to sustained interest and/or behavior regarding a specific activity while it is difficult to develop intrinsic motivation if it is not initially fostered during learning (Vallerand & Bissonette, 1992). Therefore, the mood at the time of

stimulus and training may have a lasting effect on one's impression of that stimulus (Curren & Harich, 1994). Therefore:

H4(a): Over time, individuals who had positive moods at the time of training will have greater intrinsic motivation to use a technology than those individuals who had neutral moods.

H4(b): Over time, individuals who had negative moods at the time of training will have lower intrinsic motivation to use a technology than those individuals who had neutral moods.

It was hypothesized that mood would influence extrinsic motivation at the time of training based on an individual's positive or negative attribution regarding training information presented. While research has not investigated the potential long term effects of mood on extrinsic motivation, there is evidence in social psychology research that suggests direct experience with the behavior in question is important in shaping/creating accurate individual attitudes toward the behavior (e.g., Doll & Ajzen, 1992; Fazio & Zanna, 1978a, 1978b, 1981; Regan & Fazio, 1977). Post-training, individuals can engage in ongoing technology use and have ample opportunity to learn from experience and share and receive opinions of the technology from their peers. It is expected that these activities create more salient perspectives on the technology's usefulness and more fully shape an individual's extrinsic motivation regarding the technology. Furthermore, these experiences and information sharing occur over a lengthy period of time after the initial mood induction, thus minimizing or possibly removing any network association of the initial mood state with current perceptions of the technology's value. Therefore:

H5: Over time, there will be no differences in extrinsic motivation between individuals who had positive, neutral, or negative moods at the time of training.<sup>1</sup>

The additive relationship between intrinsic and extrinsic motivation as determinants of intention to use technology in the long term is also expected to be similar to what was discussed earlier (please see H3(a) and H3(b)). It was hypothesized that a mood-congruent priming influence would affect intrinsic motivation post-training (H4(a) and H4(b)). Therefore:

H6(a): Over time, individuals who had positive moods at the time of training will have greater intentions to use a technology than those individuals who had neutral moods.

H6(b): Over time, individuals who had negative moods at the time of training will have lower intentions to use a technology than those individuals who had neutral moods.

In conclusion, the long-term effects of mood were hypothesized to be comparable to the short term effects with the exception of extrinsic motivation.

## METHOD

### *Setting and Participants*

Three hundred eighty-eight employees of a midsize accounting firm participated in this study resulting in 316 usable responses across both waves of data

<sup>1</sup> We would prefer not to use a null form of the hypothesis here. However, prior mood literature provides very little guidance when looking at long-term effects of extrinsic motivation, and other psychology research suggested that there is not likely to be a directional effect.

collection. This firm is located in a large Midwestern city, and participants were located at three separate branches within the metropolitan area. While all the respondents had prior experience using computers, they did not have any prior knowledge about or experience with the database system or database training that occurred during the study.

Of the 316 participants, 104 were women (33%) and 212 (67%) were men. The average age of the participants was 41.8, with a range from 22 to 58. On average, participants had 15.1 years of work experience, with a range from 6 months to 24 years, and 4.2 years of tenure in the specific organization, with a range from 3 months to 24 years. The participants had used computers for an average of 3.3 years, with their experience ranging from 6 months to 22 years.

### *Experimental Materials*

Twenty-five minute video clips were used to induce positive and negative moods in a manner consistent with prior research (Baumgardner & Arkin, 1988; Brand, Versupui, & Oving, 1997; Curren & Harich, 1993; Forgas, Bower, & Moylan, 1990). To minimize the possibility of our mood inducement being "video specific," two positive- and two negative-mood-inducing videos were used. One positive mood inducement was based on an episode of the popular NBC series "Seinfeld." The specific episode used was titled "The Soup Nazi"; Appendix 1 provides a brief description of the episode from *TV Guide*.<sup>2</sup> The second positive mood video, edited from the "NBA Superstar Video Series," featured the career highlights of NBA superstar Kareem Abdul-Jabbar.<sup>3</sup>

Similarly, two videos were used to induce negative mood. One video was an edited version of a documentary describing details from World War II. The documentary was recorded from the cable-TV channel "History." Specifically, the segment of the documentary conveyed how prisoners were treated in Hitler's concentration camps including recreations of the execution of prisoners. The second video featured a devastating injury to a college football player while playing a football game. The video presented multiple camera angles on the play causing the injury, clips from the hospital, and reactions of family and friends.

In assessing the alternatives to create a neutral mood (e.g., neutral video vs a waiting period with no explicit manipulation), we chose to implement this manipulation by creating a 25-min waiting period under the auspices of waiting for the training team to arrive. Although control was somewhat lost in ensuring

<sup>2</sup> At the time of the development of the research plan, the authors consulted with 10 peers and 7 of them named this specific episode to be among the top-three funniest "Seinfeld" episodes, with 6 of them rating it to be the "funniest." In a brief survey of an undergraduate class, 20 of 35 rated this episode among the top three, with 14 of them rating this episode as the funniest. The chosen episode received a *TV Guide* rating of four stars (highest rating).

<sup>3</sup> Kareem Abdul-Jabbar was a member of the Milwaukee Bucks and Los Angeles Lakers during a career that spanned about 20 years. During this time, he was a member of six NBA championship teams and won six "Most Valuable Player" awards. When he retired, he led the league in nine statistical categories. Recently, he was also named to the list of "The 50 Greatest Players in NBA History."

that these participants were in a neutral mood at the start of training, manipulating the neutral condition in this manner facilitated the examination of the influence of naturally occurring moods on motivation and intentions to use technology. A manipulation check was performed assessing mood state and a post hoc analysis was performed by examining the more positive and more negative participants to understand what, if any, naturally occurring mood effects might exist.

### *Measurement*

Extrinsic motivation, intrinsic motivation, and behavioral intention were all measured using validated scales from Davis et al. (1992). Prior research assessing the influence of motivation on computer technology acceptance has measured extrinsic motivation as perceived usefulness and intrinsic motivation as perceived enjoyment (Davis et al., 1992). Perceived usefulness refers to an individual's expectation that computer usage will result in enhanced job performance/productivity (Davis, 1989; Davis et al., 1989) and was measured using a four-item scale. There has been strong and consistent empirical evidence supporting the reliability and validity of the scale (Davis, 1989; Davis et al., 1989; Mathieson, 1991; Segars & Grover, 1993; Taylor & Todd, 1995; Szajna, 1996; Venkatesh & Davis, 1996).

Similarly, intrinsic motivation has been measured in a variety of ways including an individual's perceived enjoyment (Davis et al., 1992; Wicker, Brown, Wiehe, & Simon, 1992). Specific to computer technology, enjoyment has been defined as the extent to which using a computer is perceived to be enjoyable distinct from any performance outcomes that might be obtained (Davis et al., 1992; Deci, 1971; Malone, 1981) and was measured using a three-item scale adapted from Davis et al. (1992).

Behavioral intention to use a technology was measured using a two-item scale from Davis et al. (1992) and adapted from the measures used in the Theory of Reasoned Action and the Theory of Planned Behavior (Ajzen, 1985, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975).

To assess the effectiveness of the mood manipulation, mood was measured using the Positive Affect Scale of the Job Affect Scale (Brief, Burke, George, Robinson, & Webster, 1988). This is a 20-item scale with 10 items measuring positive affect/mood and the remaining 10 items measuring negative affect/mood at work and has been used extensively (George, 1989, 1991). The bidimensionality of the scales indicates that positive and negative moods are not opposite ends of the same continuum nor are they necessarily mutually exclusive. Prior research has suggested that the specific mood that is the most salient exerts the greatest influence on information processing (Bower, 1991; Ellis & Ashbrook, 1988).

Finally, using a validated scale from prior research (Compeau & Higgins, 1995), computer self-efficacy was measured to ensure statistical equivalence among the different groups in terms of perceptions about their ability to use

computers. Two objective measures—knowledge test scores and post-training technology use—were also collected.

The longitudinal nature of this research dictated measurements at four points in time: preexperiment ( $t_0$ ), post-training ( $t_1$ ), 6 weeks of continued use ( $t_2$ ), and 12 weeks of continued use ( $t_3$ ). The preexperimental measurement ( $t_0$ ) was focused on gathering general information from participants including their mood, computer self-efficacy, demographic information, work experience, and prior computer experience. Post-training measurement ( $t_1$ ) included mood, user reactions to the technology, and a knowledge test. The measurement 6 weeks after training ( $t_2$ ) was the same as the post-training measurement ( $t_1$ ). In addition to perceptual measures, over the first 6-week period ( $t_1$  to  $t_2$ ) and the second 6-week period ( $t_2$  to  $t_3$ ), actual usage behavior measures (number of information queries by each user) using system logs were collected to examine the predictive validity of intention. This data represented an objective measure of behavior since the system tracked and stored each employee query created using the system enabling the examination of the predictive validity of intention in this study.

Psychometric properties of the different scales were assessed. Reliability analyses indicated that all scales had acceptable reliability with Cronbach  $\alpha$  estimates over .80 at all points of measurement. Convergent and discriminant validity was supported by factor analysis with varimax rotation where all cross-loadings were less than .35. Interitem correlations also supported convergent and discriminant validity. The intercorrelations among the various constructs are provided in Table 1.

### *Procedure*

The study was conducted on 6 days over a 2-week period with five parallel sessions each day. Training each day occurred in a different office, minimizing the opportunity for participants to share information about the training sessions. Furthermore, participants report minimal interaction with personnel in different offices ( $M = 1.5$ ,  $SD = 0.3$  on a 5-point scale where 1 was minimal and 5 was extensive).

Five teams, each team comprised of a lecturer and technical consultant, conducted each training session. Each team rotated across the treatment and control groups to minimize any effects due to a specific training team. There were no more than 20 participants in a session based on an organizational desire to provide effective training and maximize individualized attention. Participants were randomly assigned to one of five groups (four treatment and one control). One hundred twelve participants provided usable responses from the positive mood intervention (54 from the “Seinfeld” intervention and 58 from the “Kareem Abdul-Jabbar” intervention), 115 usable responses were received from individuals in the negative mood intervention (59 from the “World War II” intervention and 56 from the “Player Injury” intervention), and 89 responses were received from the control group.

After arriving at the training session, all participants were told that the

**TABLE 1**  
**Means, Standard Deviations, and Correlation Matrix**

|                 | $t_0$           |                 | $t_1$           |                 |                 |                 |                 | $t_2$           |                 |                 |                 |                 |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| PM              | 4.0 (0.9)       |                 | 4.6 (0.8)       |                 |                 |                 |                 | 4.2 (0.8)       |                 |                 |                 |                 |
| NM              | 4.0 (0.9)       |                 | 4.7 (0.9)       |                 |                 |                 |                 | 4.2 (0.9)       |                 |                 |                 |                 |
| IM              |                 |                 | 4.6 (0.9)       |                 |                 |                 |                 | 4.1 (0.9)       |                 |                 |                 |                 |
| EM              |                 |                 | 4.8 (0.9)       |                 |                 |                 |                 | 4.8 (0.9)       |                 |                 |                 |                 |
| BI              |                 |                 | 5.0 (0.8)       |                 |                 |                 |                 | 4.1 (0.8)       |                 |                 |                 |                 |
|                 | PM <sub>0</sub> | NM <sub>0</sub> | PM <sub>0</sub> | NM <sub>0</sub> | IM <sub>1</sub> | EM <sub>1</sub> | BI <sub>1</sub> | PM <sub>2</sub> | NM <sub>2</sub> | IM <sub>2</sub> | EM <sub>2</sub> | BI <sub>2</sub> |
| PM <sub>0</sub> |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| NM <sub>0</sub> | -.23*           |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| PM <sub>1</sub> | .12             | -.20*           |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| NM <sub>1</sub> | .18             | .08             | -.23*           |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| IM <sub>1</sub> | .36**           | -.31**          | .22*            | -.27**          |                 |                 |                 |                 |                 |                 |                 |                 |
| EM <sub>1</sub> | .27**           | -.34**          | .18*            | .16             | .40**           |                 |                 |                 |                 |                 |                 |                 |
| BI <sub>1</sub> | .31**           | -.28**          | .14             | .15             | .41**           | .47**           |                 |                 |                 |                 |                 |                 |
| PM <sub>2</sub> | .17             | -.19*           | .28**           | -.28**          | .30**           | .25*            | .28**           |                 |                 |                 |                 |                 |
| NM <sub>2</sub> | -.27*           | .24*            | -.29**          | .29**           | -.29*           | -.14            | -.27**          | -.35**          |                 |                 |                 |                 |
| IM <sub>2</sub> | .31**           | -.28*           | .32**           | .08             | .52**           | .32**           | .47**           | .37**           | -.37**          |                 |                 |                 |
| EM <sub>2</sub> | .24*            | -.19            | .20*            | -.11            | .40**           | .35**           | .44**           | .26**           | -.27**          | .28**           |                 |                 |
| BI <sub>2</sub> | .30**           | -.29**          | .28**           | -.20*           | .38**           | .45**           | .53**           | .31**           | -.25**          | .48**           | .55**           |                 |

*Note.* In the correlation matrix, 0, 1, and 2 indicate time of measurement. 0 indicates preexperimental measurement, 1 indicates post training measurement, and 2 indicates measurement made after 6 weeks of training. PM, Positive Mood; NM, Negative Mood; IM, Intrinsic Motivation; EM, Extrinsic Motivation; BI, Behavioral Intention.

training team had been delayed due to traffic conditions. The treatment groups then watched the positive or negative videos to pass the “waiting period” while the control group did not experience any intervention during that time period. Participants then participated in the training program developed by the organization’s “Technology Management Department.” The training program took place over the course of one full work day with actual “in-class” activity lasting just over 5 h, excluding breaks for coffee and lunch. The training program consisted of: (a) a 1-h lecture describing the role of the new system in the organization, its basic functionality and features; (b) a 1 1/2-h hands-on session accompanied by a demonstration where respondents followed the lead of the lecturer; and (c) a 2-h hands-on session where the respondents completed 14 different tasks. After a brief break following the third component, participants completed a knowledge test (maximum duration: 45 min) performing 24 activities facilitating the detection of any learning differences between treatments.

### *Analysis Procedure*

Data were examined to ensure that there were no systematic differences within the positive mood and within the negative mood interventions. There were no differences between groups, and data were pooled within both positive

and both negative mood interventions respectively. ANOVA was used to determine if there were significant differences between groups, and Scheffe tests were used to isolate those differences. Short-term effects were measured at  $t_1$  while long-term effects were assessed as the mean differences between construct measures at  $t_1$  and  $t_2$ .

## RESULTS

### Manipulation Checks

The results from different manipulation checks, including mood, usage behavior, and knowledge test, were examined (see Table 2). Mood measures taken before the study ( $t_0$ ) were found to be statistically equivalent across the three groups: positive mood measure ( $F(2, 313) = .73, p = ns$ ) and negative mood measure ( $F(2, 313) = 1.01, p = ns$ ). However, mood measures assessed after the video manipulation and training indicated significant differences between interventions. Individuals in the positive mood intervention had significantly higher positive moods than those individuals in the control or negative mood interventions ( $F(2, 313) = 5.27, p < .01$ ) while those individuals in the negative mood intervention had significantly higher negative moods than those individuals in the control or positive mood intervention ( $F(2, 313) = 4.98, p < .01$ ). Finally, assessments of positive and negative mood measures 6 weeks after training ( $t_2$ ) revealed that moods across the different groups were statistically equivalent—positive mood measure ( $F(2, 313) = 1.14, p = ns$ ) and negative mood measure ( $F(2, 313) = 1.30, p = ns$ ). This pattern confirms that the video-based mood interventions took effect at  $t_1$ , but the mood itself did not sustain over time consistent with prior research (George, 1991).

A preexperimental measure of computer self-efficacy indicated that there were no significant differences across interventions ( $F(2, 313) = 1.41, p = ns$ )

**TABLE 2**  
**Manipulation Check Results**

| Manipulation check measure | Positive mood:<br>Manipulation |                     | Control group |               | Negative mood:<br>Manipulation |               |
|----------------------------|--------------------------------|---------------------|---------------|---------------|--------------------------------|---------------|
|                            | <i>M</i>                       | ( <i>SD</i> )       | <i>M</i>      | ( <i>SD</i> ) | <i>M</i>                       | ( <i>SD</i> ) |
| Positive mood ( $t_0$ )    | 4.1                            | (.9) ( <i>ns</i> )  | 3.9           | (.9)          | 4.1                            | (.9)          |
| Negative mood ( $t_0$ )    | 4.0                            | (.8) ( <i>ns</i> )  | 4.0           | (1.0)         | 4.1                            | (.9)          |
| Positive mood ( $t_1$ )    | 5.9                            | (.8)**              | 3.8           | (.8)          | 4.0                            | (.8)          |
| Negative mood ( $t_1$ )    | 4.2                            | (1.0)**             | 3.9           | (.9)          | 6.0                            | (.9)          |
| Positive mood ( $t_2$ )    | 4.3                            | (.9) ( <i>ns</i> )  | 4.2           | (.8)          | 4.1                            | (.8)          |
| Negative mood ( $t_2$ )    | 4.4                            | (.8) ( <i>ns</i> )  | 4.0           | (.9)          | 4.3                            | (.9)          |
| Computer self-efficacy     | 7.3                            | (1.4) ( <i>ns</i> ) | 7.1           | (1.8)         | 7.6                            | (1.2)         |
| Test score                 | 17.2                           | (2.4) ( <i>ns</i> ) | 17.9          | (1.9)         | 17.5                           | (2.1)         |

Note. *ns*, not significant.

\*  $p < .05$ .

\*\*  $p < .01$ .

and a postexperimental measure of learning using test scores indicated that learning was equivalent across the three interventions ( $F(2, 313) = .53, p = ns$ ).

Finally, strong relationships were found between behavioral intention at  $t_1$  and actual usage in the 6-week period between  $t_1$  and  $t_2$  ( $r = .57$ ) and between behavioral intention measured at  $t_2$  and actual usage in the 6-week period following  $t_2$  ( $r = .59$ ). Further, regression analyses revealed that the effect of intrinsic and extrinsic motivation on usage was fully mediated by behavioral intention, thus providing support for the examination of behavioral intention as the key dependent variable.

### *Hypothesis Testing*

Hypotheses 1 through 3 examined the short-term effects of mood on motivation and intention to use the technology. Hypotheses 1(a) and 1(b) suggested that participants having positive mood states would have higher intrinsic motivation while those in negative moods would have lower intrinsic motivation immediately after training. The ANOVA suggested significant results ( $F(2, 313) = 28.26, p < .001$ ) (see Table 3). Participants in the positive mood treatment had significantly higher intrinsic motivation ( $M = 6.3$ ) than the control group ( $M = 4.6$ ) ( $t(200) = 2.89, p < .01$ ). Similarly, participants in the negative mood treatment ( $M = 3.4$ ) exhibited significantly lower intrinsic motivation than the control group ( $t(203) = 2.97, p < .01$ ). Therefore, H1(a) and H1(b) were supported.

Hypotheses 2(a) and 2(b) suggested that there would be similar pattern of differences in extrinsic motivation across mood states. As indicated in Table

**TABLE 3**  
**Short-Term Effects: Cross-Sectional Analysis of the Impact of Interventions on Constructs at  $t_1$**

|                             | <i>M</i> | <i>(SD)</i> | Significance of difference<br>between intervention<br>and control group |
|-----------------------------|----------|-------------|---|
| <b>Intrinsic motivation</b> |          |             |   |
| Positive mood intervention  | 6.3      | (0.8)       | **  |
| Negative mood intervention  | 3.4      | (0.9)       | **  |
| Control group               | 4.6      | (0.9)       |   |
| <b>Extrinsic motivation</b> |          |             |   |
| Positive mood intervention  | 4.9      | (1.0)       | <i>ns</i>   |
| Negative mood intervention  | 4.8      | (0.8)       | <i>ns</i>   |
| Control group               | 4.7      | (0.9)       |   |
| <b>Behavioral intention</b> |          |             |   |
| Positive mood intervention  | 6.1      | (0.9)       | *   |
| Negative mood intervention  | 3.9      | (0.8)       | *   |
| Control group               | 5.0      | (0.8)       |   |

*Note.* *ns*, not significant.

\*  $p < .05$ .

\*\*  $p < .01$ .

3, the results indicated that there were no differences ( $F(2, 313) = 1.21, p = ns$ ) in extrinsic motivation among participants in positive ( $M = 4.9$ ), negative ( $M = 4.8$ ), and neutral ( $M = 4.7$ ) mood treatments. Therefore, H2(a) and H2(b) were not supported.

Hypotheses 3(a) and 3(b) suggested that there would also be mood congruent differences in participants' intention to use technology across mood states. The ANOVA suggested significant results ( $F(2, 313) = 21.25, p < .001$ ) where participants in the positive mood treatment had significantly higher behavioral intentions to use the technology ( $M = 6.1$ ) than the control group ( $M = 5.0$ ) ( $t(200) = 2.08, p < .05$ ), and participants in the negative mood treatment ( $M = 3.9$ ) had significantly lower intention than the control group ( $t(203) = 2.17, p < .05$ ). Therefore, H3(a) and H3(b) were supported.

Hypotheses 4 through 6 examined the sustainability of outcomes corresponding to H1 through H3. Hypotheses 4(a) and 4(b) suggested that, over time, participants having positive mood states at the time of training would have higher intrinsic motivation while those in negative moods would have lower intrinsic motivation. The ANOVA results ( $F(2, 313) = 14.74, p < .001$ ) (see Table 4) indicated that participants in the positive mood treatment ( $M = 4.9$ ) exhibited intrinsic motivation comparable to the control group ( $t(200) = .98, p = ns$ ), while participants in the negative mood treatment had significantly lower intrinsic motivation ( $M = 3.2$ ) than the control group ( $M = 4.5$ ) ( $t(203) = 2.77, p < .01$ ). Therefore, while H4(a) was not supported, H4(b) was supported.

Hypothesis 5 suggested that there would be no sustainable differences in

**TABLE 4**

**Long-Term Effects: Longitudinal Analysis of the Impact of Interventions on Constructs at  $t_2$**

|                             | <i>M</i> | ( <i>SD</i> ) | Significance of difference<br>between intervention<br>and control group |
|-----------------------------|----------|---------------|---|
| <b>Intrinsic motivation</b> |          |               |   |
| Positive mood intervention  | 4.9      | (0.7)         | <i>ns</i> (see Note)  |
| Negative mood intervention  | 3.2      | (0.9)         | **  |
| Control group               | 4.5      | (1.0)         |   |
| <b>Extrinsic motivation</b> |          |               |   |
| Positive mood intervention  | 4.8      | (0.9)         | <i>ns</i>   |
| Negative mood intervention  | 4.7      | (0.8)         | <i>ns</i>   |
| Control group               | 4.8      | (1.0)         |   |
| <b>Behavioral intention</b> |          |               |   |
| Positive mood intervention  | 4.9      | (0.9)         | <i>ns</i>   |
| Negative mood intervention  | 3.7      | (0.8)         | **  |
| Control group               | 4.9      | (0.7)         |   |

*Note.* Since the tests of differences supported the null hypotheses (results of power analysis reported under Results, the differences of means between measures taken at  $t_2$  and  $t_1$  were tested measures at  $t_2$  were statistically significantly different from  $t_1$ , *ns*, not significant.

\*  $p < .05$ .

\*\*  $p < .01$ .

extrinsic motivation across mood states over time. There were no short-term mood effects on extrinsic motivation (i.e., H2 results) and, as indicated in Table 4, there were also no long-term effects (positive mood,  $M = 4.8$ ; negative mood,  $M = 4.7$ ; neutral mood,  $M = 4.8$ ) ( $F(2, 313) = .97, p = ns$ ). Given the null hypothesis (H5), a power test was conducted (see Cohen, 1988). This test indicated that given the final sample size, our statistical tests were expected to detect a small effect size with a power of .80 and a medium effect size with a power of .90. While there is still a possibility that a difference that does exist may have failed detection, the lack of both short and long-term differences preliminarily supports equivalence across mood states. Therefore, H5 was supported.

Hypotheses 6(a) and 6(b) suggested that there would be sustained effects of differences in participants' intention to use technology across mood states. The ANOVA results indicated a significant effect ( $F(2, 313) = 13.87, p < .001$ ) (see Table 4). Participants in the positive mood treatment at the time of training did not appear to sustain their higher level of intentions at  $t_2$  ( $M = 4.9$ ) and were equivalent with the control group at  $t_2$  ( $t(200) = 1.19, p = ns$ ), while participants in the negative mood treatment at the time of training had significantly lower long-term intentions to use the technology ( $M = 3.7$ ) than the control group ( $M = 4.9$ ) at  $t_2$  ( $t(203) = 2.09, p < .01$ ). Therefore, H6(a) was not supported, but H6(b) was supported.

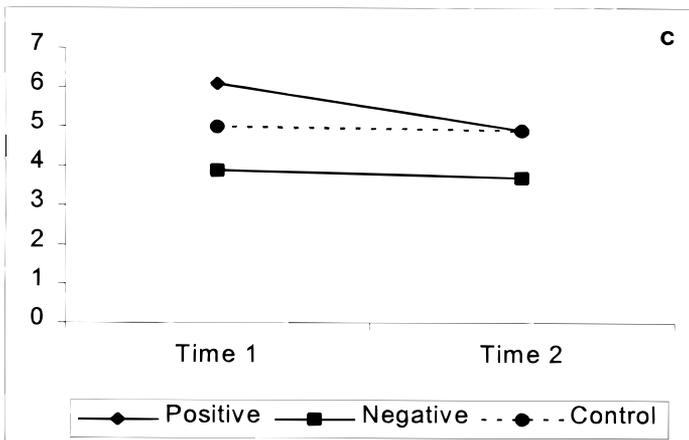
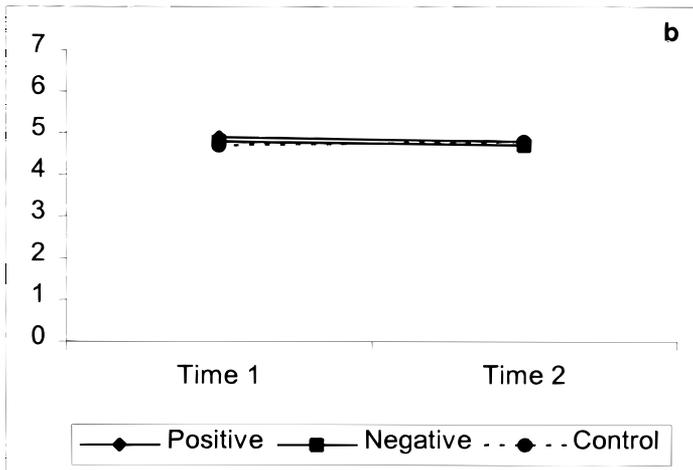
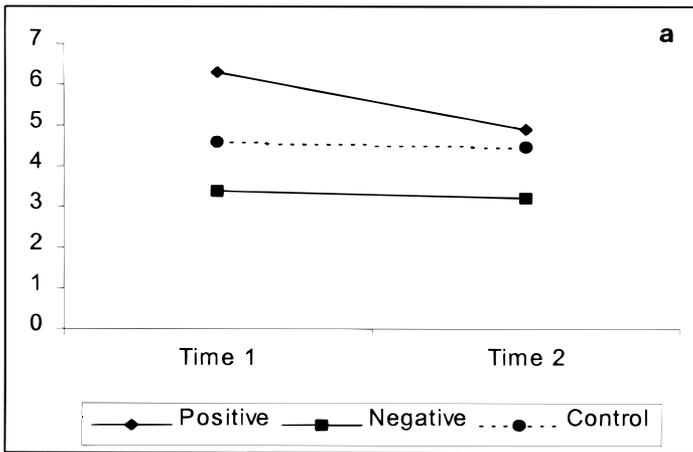
A graphical representation of the temporal dynamics of the effect of mood on intrinsic and extrinsic motivation to use the technology is presented in Fig. 1. In sum, it suggests that while no differences are observed in extrinsic motivation, the positive mood intervention has short term effects on intrinsic motivation and behavioral intention and the negative mood intervention has lasting effects on intrinsic motivation and behavioral intention.

#### *Post Hoc Analysis: Control Group Data*

Data from the control group was analyzed for two reasons: (a) to examine the effects of naturally occurring rather than induced moods, and (b) it is possible that individuals in the control group reacted differently to the "waiting period." Participants in the control group were classified into positive ( $n = 38$ ) and negative ( $n = 41$ ) mood categories based on their naturally occurring mood as measured at  $t_1$ . Nine individuals were excluded from the analysis because their mood could not be classified as more strongly positive or negative.

Results from examining the control group were consistent with the effects in the positive and negative mood inductions. There were significant differences between more positive and more negative individuals within the control group related to short-term intrinsic motivation ( $F(1, 78) = 1.66, p < .05$ ), short-term intentions ( $F(1, 78) = 1.99, p < .05$ ), long-term intrinsic motivation ( $F(1, 78) = 2.17, p < .05$ ), and long-term intentions ( $F(1, 78) = 2.04, p < .05$ ). There were no significant effects for extrinsic motivation in either the short term ( $F(1, 78) = .78, p = ns$ ) or long term ( $F(1, 78) = .61, p = ns$ ).

Interestingly, the long-term effects observed among individuals in naturally



**FIG. 1.** Graphical representation of mood effects on (a) intrinsic motivation, (b) extrinsic motivation, and (c) behavioral intention.

occurring positive or negative mood states were also consistent with the effects observed among individuals whose moods were induced. Overall, the split control group exhibited similar characteristics to individuals in the induced mood states suggesting that the findings associated with the mood interventions appear to be generalizable to naturally occurring mood states while also minimizing the possibility that demand characteristics (e.g., the mood induction itself or the survey) influenced the outcomes.

#### *Post Hoc Analysis: Effect of Mood as a Moderator*

The stated hypotheses focused on significant differences between positive or negative mood-induced individuals and those having more neutral moods. While the hypothesized differences are by themselves important, an additional issue of interest is the overall effect of mood on the relationship between intrinsic/extrinsic motivation and an individual's intention to use a technology. Therefore, the influence of both intrinsic and extrinsic motivation on intentions over time with mood as a moderating variable was assessed.

Linear regression was performed using behavioral intention as the dependent variable and extrinsic motivation and intrinsic motivation as the independent variables in each of the three groups (two treatment and one control) at  $t_1$  and  $t_2$ , respectively. In order to understand the short-term impact of the interventions on the decision-making process, the differences between the betas associated with each of the constructs across groups were evaluated (Pindyck & Rubinfeld, 1981, pp. 123–126). The moderation of key relationships (intrinsic motivation–behavioral intention and extrinsic motivation–behavioral intention) was tested by introducing dummy variables for the treatment/control groups and the moderation of both relationships was tested in a single regression equation. This procedure enabled an analysis of whether respondents in the different interventions placed differing emphasis on the key determinants of intention.

Results of the regression analyses indicated that the interaction terms were significant ( $p < .05$ ) suggesting a moderating mood effect for both the intrinsic motivation–behavioral intention and extrinsic motivation–behavioral intention relationships in both the short and long terms. The relative weights of extrinsic motivation and intrinsic motivation (provided by the beta coefficients) were compared in determining behavioral intention to use the technology at  $t_1$  (see Table 5). The beta weight of the intrinsic motivation–behavioral intention relationship of the positive mood group (.33) did not depart from the control group (.35). However, as noted in Table 6, the influence of intrinsic motivation on behavioral intention was significantly lower in the negative mood intervention (.15) compared to the control group (.34). Interestingly, participants in the negative mood treatment placed a significantly higher weight on extrinsic motivation (.59) in determining behavioral intention compared to participants in the neutral (.46) and the positive mood intervention (.45). Further, as noted in Tables 5 and 6, the variance in behavioral intention explained ( $R^2$ ) by intrinsic motivation and extrinsic motivation in each of the three groups was comparable,

**TABLE 5**

**Short-Term Effects: Cross-sectional Analysis of the Impact of Interventions on Relationships at  $t_1$**

|                            | $R^2$ | $\beta$ | Significance of difference between intervention and control group |
|----------------------------|-------|---------|---|
| Positive mood intervention | 0.35  |         |   |
| Intrinsic motivation       |       | 0.33**  | <i>ns</i>   |
| Extrinsic motivation       |       | 0.45**  | <i>ns</i>   |
| Negative mood intervention | 0.36  |         |   |
| Intrinsic motivation       |       | 0.15*   | *   |
| Extrinsic motivation       |       | 0.59**  | **  |
| Control group              | 0.35  |         |   |
| Intrinsic motivation       |       | 0.34**  |   |
| Extrinsic motivation       |       | 0.46**  |   |

Note. *ns*, not significant.

\*  $p < .05$ .

\*\*  $p < .01$ .

indicating a shift in the relative weighting of intrinsic motivation and extrinsic motivation in the negative mood intervention. The results at  $t_2$  were consistent with the pattern observed at  $t_1$ .

## DISCUSSION

This longitudinal field study provided interesting findings about the influence of an individual's mood on motivation to use computer technology and

**TABLE 6**

**Long-Term Effects: Longitudinal Analysis of the Impact of Interventions on Relationships at  $t_2$**

|                            | $R^2$ | $\beta$ | Significance of difference between intervention and control group |
|----------------------------|-------|---------|---|
| Positive mood intervention | 0.34  |         |   |
| Intrinsic motivation       |       | 0.32**  | <i>ns</i>   |
| Extrinsic motivation       |       | 0.43**  | <i>ns</i>   |
| Negative mood intervention | 0.37  |         |   |
| Intrinsic motivation       |       | 0.14*   | *   |
| Extrinsic motivation       |       | 0.61**  | **  |
| Control group              | 0.36  |         |   |
| Intrinsic motivation       |       | 0.33**  |   |
| Extrinsic motivation       |       | 0.48**  |   |

Note. *ns*, not significant.

\*  $p < .05$ .

\*\*  $p < .01$ .

the sustainability of such influence. Participants in positive moods at the time of training have greater short-term intrinsic motivation and intentions to use a specific technology. However, these positive mood effects are short-lived and 6 weeks after training, intrinsic motivation and behavioral intentions are consistent with participants in neutral moods. Participants in negative moods at the time of training had immediate decreases in intrinsic motivation and intention to use technology, and these effects were persistent even 6 weeks after continued use of the system. This finding is particularly salient given that 6 weeks after training, participants were likely to have been influenced by additional exposure to and information about the technology from peers.

As established at the outset, mood has been examined using competing models—associative network and resource allocation—and it is important to reconcile our findings in light of these perspectives. On one hand, these findings are consistent with the associative network model regarding the storing of affective and content information on linked nodes. As participants in negative mood treatments assess their intrinsic motivation and behavioral intentions to use technology 6 weeks after training, the negative mood state pervasive during training emerges through the stored affective nodes. This negative affect dampens the participants' feelings of intrinsic motivation resulting in lower intentions to use the technology. Given this perspective, one would expect that the positive mood elevation of intrinsic motivation and behavioral intention would be equally sustainable—a relationship not supported by the results.

One explanation for our asymmetrical findings (positive vs negative) relates to the differential influence of positive and negative moods on cognitive processing. From a resource allocation perspective, individuals in a positive mood are more likely to perform holistic processing (Martin, Ward, Achee, & Wyer, 1993; Murray, Surjan, Hirt, & Surjan, 1990) and may avoid extensive information processing to maintain their positive mood state (Isen, 1984, 1987). Post-training, individuals may find that using the technology requires a more thorough understanding of procedures than the holistic processing performed during training resulting in a reduction of intrinsic motivation because the user perceives the technology to be more difficult to use than originally believed. In contrast, individuals in negative moods often perform more careful processing, in part, to mitigate or attempt to change their negative mood (Asuncion & Lam, 1995). This careful processing may well result in less intrinsic motivation (e.g., following training directions carefully yet not thinking about “fun” aspects of using the technology). In other words, these individuals “learn the appropriate keys to type” but may not see the larger context in which to apply this knowledge. This rote type of learning is likely to create lower enjoyment of the technology. Furthermore, this low intrinsic motivation may well be sustainable given the difficulty of developing/increasing intrinsic motivation over time if it is not generated during initial learning (Vallerand & Bissonette, 1992). Therefore, the lowered intrinsic motivation of individuals who initially had negative moods becomes instantiated into their mindset and actual technology usage.

It is possible that taking assessments from individuals "induced" to be in a good mood actually results in artifactual inflation (e.g., halo effects; Sinclair, 1988) of technology acceptance and motivation to use it. However, a more optimistic interpretation suggests that individuals in good moods are more likely to scale the initial hurdles to technology adoption and usage. Such a favorable short term consequence could result from a positive mood leading to more effort and time spent on a task (Csikszentmihalyi, 1975; Vallerand & Bissonnette, 1992). This is particularly plausible given both the higher levels of intrinsic motivation and greater emphasis placed on intrinsic motivation by those in good moods. Thus, creating a positive mood-oriented environment for learning will create somewhat favorable user perceptions that will potentially help overcome initial hurdles and barriers to technology adoption and usage.

Our findings are consistent with general patterns in motivation research (e.g., Vallerand & Bissonnette, 1992) that developing initial intrinsic motivation during learning is critical. From a practical perspective, individuals involved with producing and/or delivering training materials should be wary of this negative mood priming effect. Results from individuals in negative mood states indicated that these moods are detrimental to intrinsic motivation and ultimately intention to use technology. Thus, developing and delivering positive mood enhancements at the beginning of training may offset the negative mood that some participants may have and also, further peak the motivation of those in a neutral mood at the beginning of the training session.

The posthoc analysis indicated that the relative weights of intrinsic and extrinsic motivation were comparable between the positive mood intervention and the control group and these weights were stable over time. However, participants in the negative mood intervention placed significantly less weight on intrinsic motivation and placed much greater emphasis on extrinsic motivation in forming their intentions to use technology. Furthermore, this relationship was found to sustain over time. The strong explanatory role of extrinsic motivation and lesser role of intrinsic motivation among individuals in negative moods could potentially be the result of more systematic processing that occurs during negative moods (Clore, Schwarz, & Conway, 1994; Schwarz, 1990; Schwarz, Bless, Strack et al., 1991; Sinclair & Mark, 1992; Weary & Gannon, 1996). This systematic processing results in diminished playfulness (Schwarz & Bless, 1991) which could have contributed to: (a) greater task focus and, thus, salience and emphasis of extrinsic motivation and (b) lowered intrinsic motivation resulting in minimal emphasis on intrinsic motivation. These patterns of results are further supported by prior research that has suggested that individuals in bad moods assess costs and benefits more than those in positive or neutral moods (Schaller & Cialdini, 1990). The sustenance of the pattern observed among participants in the negative mood intervention can be explained, to a certain extent, by the minimal role of intrinsic motivation early in the learning process, thus causing it to be minimally emphasized in the long term also (Vallerand & Bissonnette, 1992).

### *Implications for Future Mood Research*

In addition to the implications for mood effects on training, this research also makes strides in addressing theoretical and practical issues in mood research. First, this study investigates mood effects over a relatively long duration (e.g., 6 weeks). Although this is not the first research study to examine longitudinal effects (e.g., Curren & Harich (1994) examined mood effects 24 h after inducement), it uses a significantly longer time horizon in examining the sustainability of mood effects. The significance of the negative mood induction six weeks after the initial training suggests that detrimental effects of mood may be far more significant and enduring than previously thought.

A second important facet of this research is the background of the participants and the manner in which mood was induced. This is perhaps the first study examining the effects of mood that has employed “real subjects” in a real world training setting. Furthermore, prior mood research has acknowledged a concern with experimental demand characteristics of subjects “knowing” that a video, music, etc. was provided to influence their affective state and the resulting outcomes of induced versus naturally occurring moods (Kwiatkowski & Parkinson, 1994). In this research, employees did not perceive that they were participating in an experiment and therefore, the video induction was likely to be a plausible manner in which to fill time given the “traffic problems of the trainers.” Therefore, the mood induction implemented is likely to be more consistent with a naturally formed mood extending the meaningfulness of the findings.

### *Limitations and Future Research Directions*

The longitudinal nature of this research resulted in significant findings regarding the influence of mood on motivation. However, it is also plausible that the difference in effects between the short term ( $t_1$ ) and the long term ( $t_2$ ) may be related to factors not directly attributable to the intervention. However, our findings were quite strong and consistent across the three different offices of the participating organization, thus lending additional credence to the long-term influence of mood.

One potential limitation of the current work is that the findings are a result of demand characteristics (e.g., measurement of mood), particularly long-term mood measurement resulting in an increased salience and recall of initial reactions to the technology following training. However, given similar mood effects among control group participants, this concern is alleviated to a great extent. Other limitations of this research relate to the training and technology employed. It is possible that the corporate-designed training program somehow reinforced the mood states of the participants while other training designs might have mitigated the initial mood states. Likewise, these effects were found during training on a specific computer technology. It is possible that other technologies or training for other types of activities might further reinforce or mitigate the initial mood state of the participant. Finally, the Holocaust video negative mood intervention used in this research may have provoked some deep emotional responses that may have been greater in intensity than the

positive mood manipulations. However, the use of two different negative and positive mood videos somewhat alleviates this issue.

With the caution of these limitations in mind, what future research directions appear to be most fruitful? To date, the effects of mood have been suggested to be largely short term. However, our research presents an alternative perspective that departs from accumulated knowledge in the area. Further research is warranted to examine the generalizability of our findings and also identify potential boundary conditions of these results. Understanding the generalizability and validity of these results has direct ramifications for organizations and those individuals in organizations managing training. As suggested at the outset, the importance of this issue is further amplified since organizations are spending about \$20B/year on computer-related training (Industry Report, 1996). Such negative moods and its detrimental effects on training also offers one potential explanation for indications that only 10% of all training leads to behavior changes (Georgenson, 1982). The diminished training benefits to individuals' in negative moods results in poorly spent resources and, in all likelihood, less effective employees.

### *Conclusions*

The longitudinal field study described in this paper sought to investigate a previously overlooked topic: the short- and long-term effects of employee mood (at the time of computer technology training) on the motivation and intention to use the specific technology. The data from our study indicated that positive moods at the time of training result in short term increases in intrinsic motivation and intention to use the technology. However, these effects did not sustain over the long term (i.e., 6 weeks). On the other hand, employees in negative moods at the time of training exhibited decreased intrinsic motivation and intentions to use technology in the short term, and these effects were persistent 6 weeks later, even after active use of the technology. These findings have important theoretical and practical implications for employee training and at the same time, contribute to the research stream assessing mood effects by examining their sustainability.

## APPENDIX 1

### **Video Intervention to Foster Positive Mood: "Seinfeld" Episode Titled "The Soup Nazi"**

In their quest for knee-bucklingly good soup, Jerry, George & Co. want to bend to the will of the abuse-ladling Soup Nazi, but their basic instincts keep getting in the way. George whines when he doesn't get free bread. ("No soup for you!" the S.N. barks.) Elaine's overly familiar tone gets her the heave-ho. When Jerry brings along his gloopily affectionate girlfriend, Sheila ("Schmoopie!"), she gets tossed, then tries to make Jerry leave too. Torn between love and bisque, Jerry finally says, "Do I know you?" Only Kramer bonds with souperman, who offers up a spare armoire when Cosmo tells him the sad tale of a friend whose antique was stolen. Little does the Soup Nazi know that the armoire is for Elaine, now his revenge-plotting enemy, or that his priceless recipes are inside. (Source: *TV Guide*, Special Edition, "Seinfeld Forever.")

## REFERENCES

- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckman (Eds.), *Action control: From cognition to behavior* (pp. 11–39). New York: Springer Verlag.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, **50**, 179–211.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Asuncion, A. G., & Lam, W. F. (1995). Affect and impression formation: Influence of mood on person memory. *Journal of Experimental Social Psychology*, **31**, 437–464.
- Baumgardner, A. H., & Arkin, R. M. (1988). Affective state mediates causal attributions for success and failure. *Motivation and Emotion*, **12**, 99–111.
- Bower, G. H. (1981). Mood and memory. *American Psychologist*, **36**(2), 129–148.
- Bower, G. H. (1987). Commentary on mood and memory. *Behavior Research and Therapy*, **25**, 443–455.
- Bower, G. H. (1991). Mood congruity of social judgements. In J. P. Forgas (Ed.), *Emotion and social judgments* (pp. 31–55). Elmsford, NY: Pergamon Press.
- Brand, N., Verspui, L., & Oving, A. (1997). Induced mood and selective attention. *Perceptual and Motor Skills*, **84**, 455–463.
- Brief, A. P., Burke, M. J., George, J. M., Robinson, B., & Webster, J. (1988). Should negative affectivity remain an unmeasured variable in the study of job stress? *Journal of Applied Psychology*, **73**, 193–198.
- Brief, A. P., Butcher, A. H., & Roberson, L. (1995). Cookies, disposition, and job attitudes: The effects of positive mood-inducing events on job satisfaction in a field experiment. *Organizational Behavior and Human Decision Processes*, **62**, 55–62.
- Calder, B. J., & Staw, B. M. (1975). Self perception of intrinsic and extrinsic motivation. *Journal of Personality and Social Psychology*, **31**, 599–603.
- Carson, T. P., & Adams, H. E. (1980). Activity valence as a function of mood change. *Journal of Abnormal Psychology*, **89**, 368–377.
- Cervone, D., Kopp, D. A., Schaumann, L., & Scott, W. D. (1994). Mood, self-efficacy, and performance standards: Lower moods induce higher standards for performance. *Journal of Personality and Social Psychology*, **67**, 499–512.
- Clark, M. S., & Isen, A. M. (1982). Toward understanding the relationship between affect and social behavior. In A. Hastorf & A. M. Isen (Eds.), *Cognitive social psychology* (pp. 73–108). New York: Elsevier/North Holland.
- Clark, L. A., & Watson, D. (1988). Mood and the mundane: Relations between daily life events and self-reported mood. *Journal of Personality and Social Psychology*, **54**, 296–308.
- Clore, G. L., Schwarz, N., & Conway, M. (1994). Cognitive causes and consequences of emotions. In R. S. Wyer & T. K. Srull (Eds.), *Handbook of social cognition* (2nd ed., pp.323–417). Hillsdale, NJ: Erlbaum.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Compeau, D. R., & Higgins, C. A. (1995). Application of social cognitive theory to training for computer skills. *Information Systems Research*, **6**, 118–143.
- Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation, design, and analysis issues for field settings*. Chicago: Rand McNally.
- Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. San Francisco, CA: Jossey-Bass.
- Curren, M. T., & Harich, K. R. (1993). Performance attributions: Effects of mood and involvement. *Journal of Educational Psychology*, **85**, 605–609.
- Curren, M. T., & Harich, K. R. (1994). Consumers' mood states: The mitigating influence of personal relevance on product evaluations. *Psychology and Marketing*, **11**, 91–107.

- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, **13**, 319–339.
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, **35**, 982–1002.
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology*, **22**, 1111–1132.
- Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology*, **18**, 105–115.
- Deci, E. L. (1975). *Intrinsic motivation*. New York: Plenum Press.
- Deci, E. L., & Ryan, R. M. (1980). The empirical exploration of intrinsic motivational processes. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 13, pp. 39–80). New York: Academic Press.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Derryberry, D., & Tucker, D. M. (1992). Neural mechanisms of emotion. *Journal of Consulting and Clinical Psychology*, **60**, 329–338.
- Doll, J., & Ajzen, I. (1992). Accessibility and stability of predictors in the theory of planned behavior. *Journal of Personality and Social Psychology*, **63**, 754–765.
- Eich, E., Macaulay, D., & Ryan, L. (1994). Mood dependent memory for events of the personal past. *Journal of Experimental Psychology: General*, **123**, 201–215.
- Ellis, H. C., & Ashbrook, P. W. (1988). Resource allocation model of the effects of depressed mood states on memory. In K. Fielder & J. Forgas (Eds.), *Affect, cognition and social behavior* (pp. 1–21). Toronto, Canada: Hogrefe.
- Ellis, H. C., Ottaway, S. A., Varner, L. J., Becker, A. S., & Moore, B. A. (1997). Emotion, motivation, and text comprehension: The detection of contradictions in passages. *Journal of Experimental Psychology: General*, **126**, 131–146.
- Ellis, H. C., Thomas, R. L., McFarland, A.D., & Lane, J. W. (1985). Emotional mood states and retrieval in episodic memory: Elaborative training, semantic processing, and cognitive effort. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, **10**, 470–482.
- Erber, R. (1991). Affective and semantic priming: Effects of mood on category accessibility and inference. *Journal of Experimental Social Psychology*, **27**, 480–498.
- Fazio, R. H., & Zanna, M. (1978a). Attitudinal qualities relating to the strength of the attitude-perception and attitude-behavior relationship. *Journal of Experimental Social Psychology*, **14**, 398–408.
- Fazio, R. H., & Zanna, M. (1978b). On the predictive validity of attitudes: The roles of direct experience and confidence. *Journal of Personality*, **46**, 228–243.
- Fazio, R. H., & Zanna, M. (1981). Direct experience and attitude-behavior consistency. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 14, pp. 161–202). San Diego, CA: Academic Press.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intentions and behavior: An introduction to theory and research*. Boston: Addison-Wesley.
- Forgas, J. P. (1991). Mood effects on partner choice: Role of affect in social decisions. *Journal of Personality and Social Psychology*, **61**, 708–720.
- Forgas, J. P. (1992). On bad mood and peculiar people: Affect and person typicality in impression formation. *Journal of Personality and Social Psychology*, **22**, 531–547.
- Forgas, J. P. (1995). Mood and judgement: The affect infusion model (AIM). *Psychological Bulletin*, **117**, 39–66.
- Forgas, J. P., Bower, G. H., & Moylan, S. J. (1990). Praise or blame? Effective influences on attributions for achievement. *Journal of Personality and Social Psychology*, **59**, 809–819.
- George, J. M. (1989). Mood and absence. *Journal of Applied Psychology*, **74**, 317–324.

- George, J. M. (1991). State or trait: Effects of positive mood on prosocial behaviors at work. *Journal of Applied Psychology*, **76**, 299–307.
- George, J. M., & Brief, A. P. (1996). Motivational agendas in the workplace: The effects of feelings on focus of attention and work motivation. *Research in Organizational Behavior*, **18**, 75–109.
- George, J. M., & Jones, G. R. (1996). The experience of work and turnover intentions: Interactive effects of value attainment, job satisfaction, and positive mood. *Journal of Applied Psychology*, **81**, 318–325.
- Georgenson, D. L. (1982). The problem of transfer calls for partnership. *Training and Development Journal*, **30**, 75–78.
- Hasher, L., & Zacks, R. T. (1979). Automatic and effortful processes in memory. *Journal of Experimental Psychology: General*, **108**, 356–388.
- Heinssen, R. K., Glass, C. R., & Knight, L. A. (1987). Assessing computer anxiety: Development and validation of the computer anxiety rating scale. *Computers in Human Behavior*, **3**, 49–59.
- Hirst, M. K. (1988). Intrinsic motivation as influenced by task interdependence and goal setting. *Journal of Applied Psychology*, **73**, 96–101.
- Industry Report. (1996). *Training*, **33**(10), 37–79.
- Isen, A. M. (1984). Toward understanding the role of affect in cognition. In R. S. Wyer & T. K. Srul (Eds.), *Handbook of social cognition* (Vol. 3, pp. 179–236). Hillsdale, NJ: Erlbaum.
- Isen, A. M. (1987). Positive affect, cognitive processes, and social behavior. In Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 20, pp. 203–253). New York: Academic Press.
- Isen, A. M., & Levin, A. F. (1972). Effects of feeling good on helping: Cookies and kindness. *Journal of Personality and Social Psychology*, **21**, 384–388.
- Isen, A. M., Shalker, T. E., Clark, M. S., & Karp, L. (1978). Affect, accessibility of material in memory, and behavior. A cognitive loop? *Journal of Personality and Social Psychology*, **36**, 1–12.
- Keil, M. (1995). Pulling the plug: Software project management and the problem of project escalation. *MIS Quarterly*, **19**, 421–447.
- Kihlstrom, J. F. (1989). On what does mood-dependent memory depend? *Journal of Social Behavior and Personality*, **4**, 23–32.
- Kraiger, K., Billings, R. S., & Isen, A. M. (1989). The influence of positive affective states on task perception and satisfaction. *Organizational Behavior and Human Decision Processes*, **44**, 12–25.
- Kruglanski, A. W., Friedman, I., & Zeevi, G. (1971). The effects of extrinsic incentive on some qualitative aspects of task performance. *Journal of Personality*, **39**, 606–617.
- Kwiatkowski, S. J., & Parkinson, S. R. (1994). Depression, elaboration, and mood congruence: Differences between natural and induced mood. *Memory & Cognition*, **22**, 225–233.
- Leight, K. A., & Ellis, H. C. (1981). Emotional mood states, strategies, and state-dependency in memory. *Journal of Verbal Learning and Verbal Behavior*, **20**, 251–266.
- Malone, T. W. (1981). Toward a theory of intrinsically motivating instruction. *Cognitive Sciences*, **4**, 333–369.
- Martin, L. L., Ward, D. W., Achee, J. W., & Wyer, R. S., Jr. (1993). Mood as input: People have to interpret the motivational implications of their moods. *Journal of Personality and Social Psychology*, **64**, 317–326.
- Martocchio, J. J. (1994). Effects of conceptions of ability on anxiety, self-efficacy, and learning in training. *Journal of Applied Psychology*, **79**, 819–825.
- Mathieson, K. (1991). Predicting user intentions: Comparing the technology acceptance model with the theory of planned behavior. *Information Systems Research*, **2**, 173–191.
- Mitchell, T. R., Hopper, H., Daniels, D., George-Falvy, J., & James, L. R. (1994). Predicting self-efficacy and performance during skill acquisition. *Journal of Applied Psychology*, **79**, 506–517.
- Mossholder, K. W. (1980). Effect of externally mediated goal setting on intrinsic motivation: A laboratory experiment. *Journal of Applied Psychology*, **65**, 202–210.

- Murray, N., Surjan, H., Hirt, E. R., & Surjan, M. (1990). The influence of mood on categorization: A cognitive flexibility interpretation. *Journal of Personality and Social Psychology*, **59**, 411–425.
- Oaksford, M., Morris, F., Grainger, B., & Williams, J. M. G. (1996). Mood, reasoning, and central executive processes. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, **22**, 476–492.
- Osgood, C. E., & Suci, G. J. (1955). Factor analysis of meaning. *Journal of Experimental Psychology*, **50**, 325–338.
- Pavelchak, M. A., Antil, J. H., & Munch, J. M. (1988). The Super Bowl: An investigation into the relationships among program context, emotional experience, and ad recall. *Journal of Consumer Research*, **15**, 360–367.
- Pindyck, R. S., & Rubinfeld, D. L. (1981). *Econometric models and economic forecasts*. New York: McGraw-Hill.
- Regan, D. T., & Fazio, R. H. (1977). On the consistency between attitudes and behavior: Look to the method of attitude formation. *Journal of Experimental Social Psychology*, **13**, 38–45.
- Russell, J. A., & Mehrabian, A. (1977). Evidence of a three-factor theory of emotions. *Journal of Research in Personality*, **11**, 273–294.
- Schaller, M., & Cialdini, R. B. (1990). Happiness, sadness, and helping: A motivational integration. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of Social Behavior* (Vol. 2, pp. 265–296). New York: Guilford Press.
- Schwarz, N. (1987). *Stimmung als Information: Untersuchungen zum Einflub von Stimmungen auf die Bewertung des eigenen Lebens [Mood as information]*. Heidelberg: Springer-Verlag.
- Schwarz, N. (1990). Feelings as information: Informational and motivational functions of affective states. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of social cognition: Foundations of social behavior* (Vol. 2, pp. 527–561). New York: Guilford Press.
- Schwarz, N., & Bless, H. (1991). Mood congruity and social judgments. In J. P. Forgas (Ed.), *Emotion and social judgment* (pp. 55–71). Oxford: Pergamon Press.
- Schwarz, N., Bless, H., Strack, F., Klumpp, P., Rittenauer-Schatka, H., & Simons, A. (1991). Ease of retrieval as information: Another look at the availability heuristic. *Journal of Personality and Social Psychology*, **61**, 195–202.
- Schwarz, N., & Bohner, G. (1996). Feelings and their motivational implications: Moods and the action sequence. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 119–145). New York: Guilford Press.
- Schwarz, N., & Clore, G. L. (1988). How do I feel about it? The informative function of affective states. In K. Fiedler & J. P. Forgas (Eds.), *Affect, cognition, and social behavior* (pp. 44–62). Toronto: Hogrefe.
- Schaller, M. & Cialdini, R. B. (1990). Happiness, sadness, and helping: A motivational integration. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 265–296). New York: Guilford Press.
- Segars, A. H., & Grover, V. (1993). Re-examining perceived ease of use and usefulness: A confirmatory factor analysis. *MIS Quarterly*, **18**, 517–525.
- Sinclair, R. C. (1988). Mood, categorization breadth, and performance appraisal: The effects of order of information acquisition and affective state on halo, accuracy, information retrieval, and evaluation. *Organizational Behavior and Human Decision Processes*, **42**, 22–46.
- Sinclair, R. C., & Mark, M. M. (1992). The influence of mood state on judgment and action: Effects on persuasion, categorization, social justice, person perception, and judgmental accuracy. In L. L. Martin & A. Tesser (Eds.), *The construction of social judgments* (pp. 165–193). Hillsdale, NJ: Erlbaum.
- Strack, F., Schwarz, N., & Gschneidinger, E. (1985). Happiness and reminiscing: The role of time perspective, mood, and mode of thinking. *Journal of Personality and Social Psychology*, **49**, 1460–1469.

- Swanson, E. B. (1988). *Information system implementation: Bridging the gap between design and utilization*. Homewood, IL: Irwin.
- Swinyard, W. R. (1993). The effects of mood, involvement, and quality of store experience on shopping intentions. *Journal of Consumer Research*, **20**, 271–280.
- Szajna, B. (1996). Empirical evaluation of the revised technology acceptance model. *Management Science*, **42**, 85–92.
- Tannenbaum, S. I. (1990). Human resource information systems: User group implications. *Journal of Systems Management*, **41**, 27–32.
- Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, **6**, 144–176.
- Vallerand, R. J., & Bissonnette, R. (1992). Intrinsic, extrinsic, and amotivational styles as predictors of behavior: A prospective study. *Journal of Personality*, **60**, 599–620.
- Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. *Advances in Experimental Social Psychology*, **29**, 271–360.
- Vallerand, R. J., Fortier, M., & Guay, F. (1997). Self-determination and persistence in a real-life setting: Toward a motivational model of high school dropout. *Journal of Personality and Social Psychology*, **72**, 1161–1177.
- Venkatesh, V. (in press). Creation of favorable user perceptions: Exploring the role of intrinsic motivation. *MIS Quarterly*.
- Venkatesh, V., & Davis, F. D. (1996). A model of the antecedents of perceived ease of use: Development and test. *Decision Sciences*, **27**, 451–481.
- Watson, D., & Tellegen, A. (1985). Toward a consensual structure of mood. *Psychological Bulletin*, **98**, 219–235.
- Weary, G., & Gannon, K. (1996). Depression, control motivation, and person perception. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 146–167). New York: Guilford Press.
- White, C. E., Jr., & Christy, D. P. (1987). The information center concept: A normative model and a study of six installations. *MIS Quarterly*, **11**, 451–458.
- Wicker, R., Brown, G., Wiehe, J. A., & Shim, W. (1992). Moods, goals, and measures of intrinsic motivation. *Journal of Psychology*, **124**, 75–86.
- Worth, L. T., & Mackie, D. M. (1987). Cognitive mediation of positive affect in persuasion. *Social Cognition*, **5**, 76–79.