

## **Chapter 2**

### **LITERATURE REVIEW**

In 1977, the world of psychology saw the emergence of a theory of behavior that would forever change the direction and dimensionality of behavioral and cognitive research--Social Cognitive Learning Theory. Prior to this theory, the predominant focal point of psychological research revolved around a *Tolmanian* doctrine of outcome expectations. This doctrine assumed that humans learn new behaviors based on the expected rewards associated with the performance of those behaviors. This outcome expectation paradigm, though intrinsically relevant for explaining behavior in animals, was found to be inadequate for explaining most human behavior.

#### **2.1 DEVELOPMENT OF THE SOCIAL COGNITIVE THEORY**

With the advent of Social Cognitive Theory came a transformation in the way investigators approached behavioral research. Prior to the Social Cognitive Theory, behavior was presumed to be influenced primarily by environmental factors, such as *expected outcomes*. In his “Unifying Theory of Behavioral Change,” Bandura (1977) introduced a cognitive factor, *self-efficacy*, into behavioral theory. He suggested that humans were not driven exclusively by environmental factors, but rather that a “triadic reciprocal causation” existed between environmental events, cognitive factors, and behavior (Wood and Bandura, 1989). He insisted that behavior affected and was affected by both external (environmental) events and internal (cognitive) factors. Hence, the self-efficacy/outcome expectation model of human behavior was conceived.

Perhaps the most important contribution of Bandura's research was not in the introduction of a new construct into the behavioral model, but rather in the development of the direct, indirect, and reciprocal relationships between behavior, outcome expectations, and self-efficacy. Bandura suggested that behavior was governed by outcome expectations and self-efficacy, and that outcome expectations and self-efficacy, in turn, were influenced by prior behaviors. He defined a “triadic reciprocal causation” between self-efficacy, outcome expectations, and behavior. That is, he suggested that not only is behavior affected by self-efficacy and outcome expectations, but that self-efficacy and outcome expectations are affected by behavior. Bandura insisted that as a person repeatedly performs a given behavior, he learns what outcomes he can expect and, consequently, alters or confirms his beliefs about his abilities to execute the behavior.

Bandura defined self-efficacy as one’s personal beliefs about his/her abilities to perform certain activities. He distinguished between actual abilities and perceived abilities. That is, one’s *possession* of abilities was not enough to facilitate behavior. Instead, one had to *believe* that he/she could actually use those abilities to perform an action before a behavioral change could occur. Bandura also suggested that self-efficacy influenced behavior *through* outcome expectations. That is, he reasoned that one’s behavior was governed by outcome expectations, which were influenced by perceptions of one’s own abilities to successfully perform a given behavior.

To illustrate, assume an individual knows that becoming a medical doctor brings with it respect and wealth. This is an outcome expectation. If that same individual believes he has limited ability to maintain high grades in science and achieve the desired outcome, he will not even attempt to pursue a career in medicine. Despite his aspiration for respect and wealth in the medical profession, his low self-efficacy will undermine his efforts to perform the behaviors necessary to attain his goals (Bandura, 1978).

### **2.1.1 Interaction of Social Cognitive Factors**

In addition to proposing causal relationships between self-efficacy, outcome expectations, and behavior, Bandura also suggested the mechanisms by which these constructs affect each other. He identified four sources of information that interact to develop self-efficacy expectations, which, in turn, affect outcome expectations and behavior: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal.

#### **2.1.1.1 Performance Accomplishments**

Of these four factors, performance accomplishments represent the reciprocity of the Social Cognitive Model. That is, prior behaviors, or “accomplishments,” influence future behaviors via their effects on outcome expectations and self-efficacy. Through examination of this single relationship, behavioral change is an endless cycle of performance and feedback. Unfortunately, this recursive process is analytically untestable. That is, in one instance, self-efficacy and outcome expectations are the presumed causes of behavior. In the same model, behavior is the presumed cause of self-efficacy and outcome expectations. Assuming that self-efficacy and outcome expectations are exogenous constructs and that behavior is an endogenous construct, or even vice versa, this relationship is not statistically viable. Even the most sophisticated statistical modeling techniques cannot reconcile non-recursive path models between latent endogenous variables and latent exogenous variables (Pedhazur & Smelkin, 1991).

Assume an individual attempts to perform a task and fails. His failure, in turn, decreases his self-efficacy and outcome expectations. With these lowered feelings of self-belief, this individual is less likely to succeed the next time he performs the same task. Consequently, his self-beliefs and expectations decrease again. He is caught in an unending downward spiral of self-doubt and repeated failure. Clearly, at some point, an outside intervention is necessary to break the pattern of failure and self-recrimination.

This example, characteristic of phobic behavior, partly explains why Bandura developed and investigated the mechanisms by which behavior affects and is affected by self-efficacy and outcome expectations. Much of his research was devoted to understanding phobias, which typically result from the endless cycle of failure and self-doubt. Bandura found that although performance accomplishments are excellent predictors of self-efficacy, outcome expectations, and future behavior, their effects are not testable in simple models due to their reciprocity. Consequently, he introduced the additional factors (vicarious learning, verbal persuasion, and emotional arousal) to provide a non-reciprocal entrance into the nomological network of self-efficacy, outcome expectations, and behavior.

#### **2.1.1.2 Vicarious Experience**

The first factor examined in the Social Cognitive model is vicarious experience, which is characterized by a tendency for individuals to experience feelings of accomplishment by watching models successfully demonstrate behaviors. Inherent in vicarious experience is the assumption that individuals identify with the model. Much in the same way that a person watches an actor on television and emotionally “becomes” that character for the duration of the show, a person increases or decreases his own self-efficacy by observing a model and sharing the model’s feelings of success or failure when executing a task. The usefulness of vicarious experience, however, lies in the similarity of the model and the observer (Brown & Inouye, 1978).

#### **2.1.1.3 Verbal Persuasion**

Verbal persuasion, the next factor in Bandura’s model, is used to enhance performance and build self-efficacy through guided encouragement. Verbal persuasion is an extremely powerful technique for changing behavior and is prevalent in much of psychotherapy today. In fact, Wood and Bandura (1989) caution against persuading

individuals to undertake behaviors that they are not physically or emotionally ready to perform. Verbal persuasion is effective in increasing self-efficacy and changing behavior only when the individual is truly capable of performing the behavior. When an individual is not capable of performing a behavior, his resulting failure undermines all previous attempts to increase self-efficacy and lessens his chances of successful performance in the future. Thus, verbal persuasion, by itself and through an interaction with performance accomplishments, is a powerful method of altering self-efficacy beliefs.

#### **2.1.1.4 Emotional Arousal**

The final source of self-efficacy manipulation is emotional arousal. Typically associated with emotions such as anxiety and fear, emotional arousal is one of the major obstacles in behavioral change as it produces a condition known as *avoidance behavior*. Avoidance behavior is the active or passive resistance of activities deemed as fearful, stressful, or otherwise ineffective and is especially sensitive to manipulation of the three factors discussed above (e.g. prior performance, vicarious experience, and verbal persuasion). Also termed “learned helplessness,” avoidance behavior occurs when people cease trying because they doubt their own abilities or because they deem their efforts to be futile in an “unresponsive environment” (Bandura, 1977). Emotional arousal is the chief impediment to performance and facilitator of avoidance behavior as it manifests itself in increased anxiety and, ultimately, feelings of self-doubt.

Historically, avoidance behavior has been treated by repeated exposure to stimuli that produce heightened levels of anxiety (Bandura, 1978 Reflections, p.257). Although it has been relatively successful in eliminating avoidance behavior, this desensitization method has been extremely stressful for many patients. As a less severe way to treat avoidance behavior, Bandura suggests the use of vicarious learning approaches to reduce anxiety and build self-confidence. This technique allows subjects to experience the feelings of success by watching others master specific tasks. Thus, by enhancing their self-efficacy expectations, subjects have less emotional arousal (e.g. anxiety) and are more

willing to attempt performance.

## **2.2 RESEARCH IN SOCIAL COGNITIVE THEORY**

Bandura's introduction of self-efficacy, mediated by performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal, represents the foundation of Social Cognitive Theory. For two decades, his contribution to the world of psychology has been central to an understanding of the causes of learning and behavioral change. Armed with a new perspective on understanding and testing the elements in the Social Cognitive Model, researchers have aspired to augment or disprove Bandura's assertions and, consequently, have produced numerous studies.

### **2.2.1 Information Systems Research**

Since its introduction in 1977, psychologists have been the predominant investigators of self-efficacy, outcome expectations, and behavior. Within the past decade, however, Social Cognitive constructs have begun to appear in various studies outside of psychology.

It should come as no surprise that with the burgeoning development of computer technology in the past two decades, the elements of Social Cognitive Theory have infiltrated information systems literature. For example, Hill, Smith, and Mann (1987) provided one of the first empirical investigations into the role of efficacy expectations in predicting the decision to use computers. Davis (1989) addressed self-efficacy theory in his investigation of perceived usefulness, ease of use, and acceptance of information technology. Martocchio and Webster (1992) addressed software efficacy as a function of feedback and cognitive playfulness in microcomputer software training. Webster and Martocchio (1992) developed an instrument to measure microcomputer playfulness that included computer efficacy beliefs. Gist, Schwoerer, and Rosen (1989) examined the

effects of alternative training methods for computer use on self-efficacy.

### **2.2.1.1 Compeau and Higgins (1995)**

In one of the most recently published studies on Social Cognitive Theory in Information Systems, Compeau and Higgins (1995) developed a model that examined the effects of behavior modeling on training for computer skills. According to this model, four factors were hypothesized to directly and indirectly influence performance on computer tasks: prior performance, computer self-efficacy, outcome expectations, and behavior modeling.

Presented in Chapter 1, Figure 1.1 illustrates the C&H model. It represents the first attempt to combine most of the elements of Social Cognitive Theory into a testable model for information systems training.

In their experiment, C&H assessed the viability of their model by comparing a traditional lecture-based training program to a behavior modeling training program to instruct subjects on the use of a computer spreadsheet program and a word processing program. Eighty-eight subjects received a two-day training course on the use of Lotus 1-2-3 and WordPerfect 5.1. The subjects were divided into two groups: one receiving traditional lecture-based training for both software packages and the other receiving behavior modeling training for both packages. Instruction for Lotus preceded that for WordPerfect on both days of the study. To control for the variability of subjects' prior computer performance, all subjects were chosen based on an initial screening to select only those participants with minimal prior experience. Measures of self-efficacy and outcome expectations were taken after the training sessions but before the performance test.

The study's results revealed only partial support for the hypothesized model. As revealed in Table 2.1, behavior modeling was found to be significantly more effective than the traditional lecture-based training for Lotus performance. For the WordPerfect

training, however, behavior modeling produced no significant improvement. Also, behavior modeling was shown to positively affect computer self-efficacy for the Lotus tests, but for Day 2 of the Word Perfect tests, it was shown to negatively affect self-efficacy.

As illustrated in Table 2.1, Hypotheses 1, 3, and 5 were not supported in the C&H study. In fact, C&H acknowledged various deficiencies in their model: “Overall, this research does not provide support for the model as presented...However, some aspects of the model received strong support, others were supported for one software package but not the other, and some received no support at all.” (Compeau & Higgins, 1995)

**Table 2.1 Summary of Compeau & Higgins’s Results (1995)**

Hypotheses		Model 1 (Lotus 1) Day 1	Model 2 (WP 1) Day 1	Model 3 (Lotus 2) Day 2	Model 4 (WP 2) Day 2
H1:	Modeling --> Self-efficacy	0.398*	-0.017	0.161*	-0.173(X)
H2a:	Modeling --> Performance O.E.	-0.230(X)	0.194*	0.148*	0.166
H2b:	Modeling --> Personal O.E.	-0.416(X)	0.201*	0.216*	0.224*
H3:	Modeling --> Performance	0.243*	-0.012	0.194*	-0.203
H4a:	Self-efficacy --> Performance O.E.	0.577*	0.432*	0.507*	-0.006
H4b:	Self-efficacy --> Personal O.E.	0.461*	0.139*	0.205*	0.157*
H5:	Self-efficacy --> Performance	0.086	0.637*	0.287*	0.439*
H6a:	Performance O.E. --> Performance	0.116*	-0.101(X)	-0.143(X)	-0.273(X)
H6b:	Personal O.E. --> Performance	-0.142(X)	-0.136(X)	-0.259(X)	0.083
H7:	Prior Performance --> Self-efficacy			0.482*	0.092
H8a:	Prior Performance --> Performance O.E.			-0.128(X)	-0.121
H8b:	Prior Performance --> Personal O.E.			-0.210(X)	-0.332(X)
H9:	Prior Performance --> Performance			0.413*	0.340*

\* p < .05

Paths marked with (X) are significant, but in the opposite direction to that predicted by the hypotheses.

Compeau and Higgins (1995), Information Systems Research, Vol. 6 No. 2, 1995, p.131.

The table above illustrates the hypotheses proposed in the C&H study and their corresponding path coefficients. Items that are highlighted represent findings that were inconsistent with the original hypotheses.

### **2.2.1.2 Gist, Schwoerer, and Rosen (1989)**

Prior to this research, only Gist, Schwoerer, and Rosen (1989) had attempted to incorporate the effects of behavior modeling into the prevailing self-efficacy paradigm for computer training. The approach taken by C&H differed from GSR in that the former examined more aspects of the Social Cognitive Theory of Learning, developed a formal, testable model based on this theory, and employed a different (and possibly more appropriate) type of analysis for testing the direct and indirect relationships between the causal constructs in the model .

GSR tested the effects of two different training methods by comparing a "tutorial," or computer-aided instruction (CAI) approach, to a behavior modeling technique, a method in which a model actually demonstrates the procedures to be performed. This latter method was introduced in Bandura's earlier research as a vicarious learning mechanism whereby subjects learn via the experiences of others. GSR hypothesized that behavior modeling would result not only in better overall performance, but also in increased self-efficacy, a more positive attitude toward the training task, and a more concentrated working style than the CAI technique. The data were analyzed with separate Analyses of Variance (ANOVAs) to test the interactive effects of types of training on self-efficacy and, ultimately, performance. Affective response and working style also were analyzed using ANOVAs.

### **2.2.1.3 C&H versus GSR: A Comparison**

In the C&H study, the results of traditional lecture-based instruction were compared to behavior modeling. Although no manipulation of computer aided instruction was used in the C&H study, both computer aided instruction and traditional lecture-based instruction were considered alternate forms of non-modeling techniques. C&H examined two different types of computer tasks--word processing and spreadsheets. They also included a measure for prior performance. To analyze their data, C&H used a path

analytic technique, Partial Least Squares (PLS), which uses an "ordinary least squares estimation technique to solve the [simultaneous] equations." (Compeau and Higgins, 1995)

One notable difference between the GSR and C&H results is that behavior modeling was found to improve self-efficacy and enhance performance in the GSR study, while it increased self-efficacy for **only** spreadsheet tasks in the C&H study. For the word processing tasks, C&H found that behavior modeling did not demonstrate a significant effect on overall performance but, more importantly, it produced a significant **negative** effect on computer self-efficacy.

#### **2.2.1.4 Simon and Werner, 1996**

In addition to the C&H and GSR studies, Simon and Werner (1996) examined the effectiveness of behavior modeling and two non-modeling techniques (a self-paced study and lecturing) and found that behavior modeling outperformed the non-modeling techniques on the dimensions studied (cognitive learning, skill demonstration, and user satisfaction). Although this study represented one of the first attempts to rank the effectiveness of non-modeling techniques in addition to behavior modeling, its results were limited to output assessments and did not address the processes and relationships as described in Social Cognitive theory that underlie learning.

#### **2.2.2 Summary of Information Systems Research in Social Cognitive Theory**

With a myriad of approaches for examining computer training methods, one common result underlies the studies discussed in this dissertation: In most cases, behavior modeling is a more effective technique for computer training than are non-modeling techniques. As a means of vicarious learning, it embodies the principles of Social Cognitive learning theory and exhibits relatively predictable relationships with other constructs in the Social Cognitive model. The exception to this broad statement is

demonstrated in the C&H study, where behavior modeling did not outperform lecture-based instruction when the task involved word processing in lieu of spreadsheets. Additionally, behavior modeling's effect on computer self-efficacy was shown to be variable, depending on the task to be performed.