DISSERTATION

A TRANSFER OF TRAINING EVALUATION STUDY: INVESTIGATING DIFFERENCES BETWEEN GOAL SETTING AND RELAPSE PREVENTION.

Submitted by

Robert Guardiola

Department of Psychology

In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy.

Colorado State University

Fort Collins, Colorado

Summer 2000

COLORADO STATE UNIVERSITY

May 10, 2000

WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY ROBERT J. GUARDIOLA ENTITLED A TRANSFER OF TRAINING EVALUATION STUDY: INVESTIGATING DIFFERENCES BETWEEEN GOAL SETTING AND RELAPSE PREVENTION BE ACCEPTED AT FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Committee on Graduate Work

Advisor

Department Head

ABSTRACT

A TRANSFER OF TRAINING EVALUATION STUDY: INVESTIGATING DIFFERENCES BETWEEN GOAL SETTING AND RELAPSE PREVENTION

This study assessed the effects of transfer of training methods on task performance and self-efficacy. One hundred fifty four participants were trained on how to complete a personal web page via three transfer of training methods: relapse prevention, goal setting, and a control condition (no transfer of training method). In addition, two levels of task complexity were varied between participants, giving the study a 2 X 3 between subjects design. The results showed no significant main effect for training method on a rated performance, including number of days to complete the task and percentage of required elements completed. There was a significant task complexity main effect, indicating that task complexity was shown to influence whether or not participants completed their web pages, and the percentage of required elements contained within the page. Finally, an interaction between task complexity and training method was found on self-efficacy. Specifically, there was a significant difference between the simple task – relapse prevention group and the complex task – relapse prevention group on changes in self-efficacy. Implications and suggestions for future research are discussed.

Robert James Guardiola
Psychology Department
Colorado State University
Fort Collins, CO, 80523
Summer 2000

It is widely recognized that the fundamental purpose of training is to have employees learn specific skills, jobs, abilities, and procedures (Campbell, Dunnette, Lawler, & Weick, 1970; Cascio, 1991; Tziner, Haccoun, & Kadish, 1991). Organizations hope that the employees will actually change their behavior and attitudes on the jobsite to match their trained skills. Yet in many instances, behavior on the job does not change (Goldstein, 1980). In fact, it has been estimated that only 10 percent of money spent on training actually results in behavior change back on the job (Georgenson, 1982). To highlight the enormity of the problem, it has also been estimated that approximately $200 billion is spent on training and development programs in the United States annually (McKenna, 1990). If both of the previous statements are accurate, then nearly $180 billion dollars that is spent on training and development shows no change in behaviors back on the jobsite. What the previous statements suggest is a need to further investigate different types of training methods that will produce long term behavior change. In addition, it may be helpful to investigate other types of measures of training evaluation that will predict long-term behavior. Both of these needs will be addressed in the current study.

Direction and Aim of Current Study

The aim of transfer of training techniques is to further assist the trainee to display their newly acquired skills and behaviors on the job (Tziner, et al., 1991). Therefore, at the end of the training session trainees should have high expectations, or have a high self-efficacy, of being able to transfer what they have learned, which should then translate into better job performance. But given that there are different transfer of training techniques, it may be that trainees' perceived self-efficacy of successfully transferring

their newly trained skills would differ according to the transfer of training method. Further, it may be that if trainees leave the training session with differential levels of self-efficacy, those self-efficacy differences may lead to differential performance of the training skills on the job.

The current study evaluated two specific transfer of training methods, goal-setting and relapse prevention training (RPT). However, in addition to performance measures, the criteria to be used in evaluating each transfer of training method will follow more recent work by Kraiger and colleagues as compared to the traditional Kirkpatrick (1976) criteria. This study will employ different transfer of training methods to train subjects and identify differences in the trainees' self-efficacy of successfully transferring what they have learned, and how their self-efficacy is related to subsequent performance. Also, task complexity will be manipulated to further delineate differences between the training methods, and the training method – self-efficacy relationship. The study will use theories of transfer of training methods (including goal setting and behavioral self-management), recent theories of training evaluation, research highlighting self-efficacy, locus of control, and theories concerning task complexity to identify relevant constructs and measures that need to be investigated.

A Brief Overview of the Currently Proposed Model

At this point it may be helpful to give a quick description and overview of the proposed model, which can then act as a "roadmap" for the rest of the literature review. First, the hypothesized model is shown in Figure 1. The main independent variable of interest is the

Insert Figure 1 Here

transfer of training method. The dependent variable of interest is task performance. Self-efficacy toward successfully completing the task will be measured twice (pre-training and post-training), with the expectation that self-efficacy will increase after task training. This increase in self-efficacy can be seen as a mediating variable between the transfer of training method and later task performance. Though acting as a mediating variable in the current study, literature will be reviewed that will discuss why end-of-training self-efficacy measures may be useful as dependent measure alone. Finally, the model shows two moderating variables, task complexity and locus of control. It is expected that task complexity will moderate the transfer of training method and self-efficacy link, as well as moderating any direct transfer of training method and performance link. In addition, it is expected that locus of control will also moderate the training method and performance link.

Relapse Prevention Training and Goal Setting: Highlighting Two Transfer of Training Methods

As the figure of the model shows, the main independent variable of interest is the transfer of training method. For the current study, three different transfer of training groups will be utilized: relapse prevention, goal setting, and a control condition (no transfer of training method). Literature and theory about the different transfer of training methods will be reviewed as well as research that has looked at the differences between the two methods.

Relapse Prevention.

Relapse prevention as a model of training is not a new idea. In fact, Marlatt and Gordon (1980) first introduced the term in 1980, in conjunction with the training of patients to abstain from addictive substances. Using relapse prevention in an organizational setting was first suggested by Marx (1985), as an added component of managerial training. Relapse prevention, which is grounded in a behavioral self-management approach (Luthans & Davis, 1979), takes a somewhat novel approach to training in that the method first makes trainees aware of the relapse process. In a training context, a relapse is defined as not exhibiting trained behaviors on the job, or a return to pretraining behaviors on the job. Following the model set forth by Marx (1982), trainees are asked to identify situations and stimuli that are likely to sabotage their ability to utilize their newly trained skills or behaviors. The trainees are then taught cognitive and behavioral strategies to counteract the debilitating effects of the negative stimuli so that they can continue to use their newly trained behaviors. Further, trainees are taught minor setbacks or slips are likely, but in using their newly learned cognitive and behavioral strategies (as shown in Appendix A, relapse prevention script, #8), they will be able to "self-correct." In fact, trainees are not only told that setbacks or slips are likely, but that they will happen and therefore they need to plan for it, and practice for when setbacks or slips happen. Trainees are further told that a relapse is not an indication of failure, but is a small step backward from which they can recover.

When relapse prevention was first suggested as an organizational training method, many researchers showed a high degree of interest and advocacy (Baldwin & Ford, 1988; Goldstein, 1986; Noe & Ford, 1992). However, as has been pointed out by Burke (1997),

few studies have been conducted and published, and there has been very little rigorous empirical investigation. This despite the fact that many training experts still consider there to be an acute transfer problem (Anthony & Norton, 1991; Newstrom, 1986). Latham and Seijts (1997) have recently pointed out that relapse prevention, while possibly a very powerful tool for enhancing positive transfer of training in a work setting, has not been studied in a systematic way. In addition, Latham and Seijts (1997) point out the fact that while relapse prevention is a well known transfer of training method in the fields of clinical, counseling, and sport psychology, more work on relapse prevention needs to be conducted by industrial/organizational psychologists.

According to Burke (1997), past research on relapse prevention (Marx & Karren, 1988; Noe, Sears, & Fullenkamp, 1990; Tziner et al., 1991; Wexley & Baldwin, 1986), provides support for the possible effectiveness of relapse prevention as a transfer of training tool. Specifically, Burke (1997) found that relapse prevention methods had positive impacts on trainees' ability to transfer and desire to transfer. However there simply have not been enough studies conducted. The few studies that have compared the use of relapse prevention versus strictly goal setting as transfer of training methods will be discussed shortly. But, as will also be seen, there has not been much current research investigating the two different transfer of training methods.

As mentioned, relapse prevention training is grounded in the behavioral self-management (BSM) model offered by Luthans and Davis (1979). It was their proposition that self-management is a basic prerequisite for effective management of other people, groups, or organizations. In a sense, BSM can be understood as a means of behavioral self-control, in that the trainee is taught to deliberately regulate stimulus cues, covert

processes (e.g., self-defeating cognitions, such as self-doubt, anxiety), and response consequences so that the trainee may attain identified behavioral outcomes. The first part of the training involves stimulus management, such that the trainee is shown how to manipulate environmental stimuli (stimuli both present and not present in the immediate environment). For example, if a manager has a problem with receiving and responding to too many phone calls during the day, the manager would be taught to ask the switchboard operator to take all calls during parts of the day (stimulus removal), or to put a time limit (e. g., 5 minutes) on any one phone call (selective stimulus exposure). According to the BSM model, the antecedent stimulus that was causing problems for the manager has now been taken under control.

The end part of the BSM chain, response consequence, involves self-reinforcing consequences for engaging in the appropriate behavior. BSM employs the Premack (1959) principle for self-reinforcement. The Premack principle states that behaviors a person engages in frequently can serve as a reward to increase low-frequency occurring behaviors. For example, talking with customers on the phone may be an enjoyable behavior for the manager. Using the Premack principle, the manager would not talk with customers on the phone until all of the day's incoming paperwork is processed for the day. The Premack approach is very adaptable, in that it requires the rearrangement of already existing, frequently occurring and reinforcing responses to support less frequently occurring behaviors. The rearrangement of reinforcing consequences is a vital component of a self-reward strategy for BSM.

The relapse prevention model, as set forth by Marlatt and Gordon (1980) and grounded in BSM, was originally offered as a model for maintaining abstinence from

addictive behaviors. Marx (1982) saw a similarity between the maintenance of training for addicted individuals and managers. According to Marx, while the manager trainee does not have to deal with the physiological component of addiction, the manager must confront an array of disruptive psychological and environment influences in order to maintain long-term trained behavior. Being trained in the previously mentioned relapse prevention steps then allows the trainee to overcome these psychological and environmental influences and stick with the training program back on the job.

An example given by Marx (1982) shows hypothetical responses of two managers, one trained in relapse prevention, and another who is not. The manager who is trained in the relapse prevention model is able to monitor situations that are high risk (i.e., likely to make the manager revert to pretraining behaviors) and counteract those high-risk situations by utilizing learned coping strategies. The manager is then thought to experience a sense of increased self-efficacy due to successfully utilizing the newly learned skills, which in turn will decrease the probability of a future relapse. Marx contrasts the RP trained manager with a manager not trained in the RP model. The non-RP manager fails to monitor high-risk situations and is caught by surprise. The manager has not been given any specific coping responses, and reverts back to pretrained behaviors. The manager would then feel a sense of decreased self-efficacy, which would lead to an increased probability of relapse, or reversion to pretrained behaviors. Therefore, being trained in RP would stop the downward cycle of a relapse to pretrained behaviors, and increase the likelihood of transfer of training.

Goal setting can be a component within Marx's relapse prevention training program. However, goal setting has also been investigated as a training program in and of itself, with strong and consistent findings.

Goal Setting.

Goal setting has been shown in many contexts to improve employee performance (Locke & Latham, 1984; Locke & Latham, 1990a; Locke, Shaw, Saari, & Latham, 1981). According to goal setting theory, it is believed that an individual's goals will regulate the individual's behavior and therefore will help to maintain effort and motivation on behalf of the individual (Locke, 1968). Goals create a challenge to, or a demand on the individual. Performance goals or intentions of the individual then are immediate regulators or causes of task or work performance. Goal setting theory started with situational specific, conscious motivational factors: goals and intentions. From there, goal setting theorists worked backwards in order to determine what causes goals and what makes some goals more effective than others.

While both assigned and participatively set goals increase performance (Dossett, Latham, & Mitchell, 1979; Latham & Marshall, 1982), participative goal setting has been thought to be a better method for facilitating transfer of training. Anderson and Wexley (1983) argued that participatively set goals would increase the ownership of goals and therefore make it more likely that trainees would exhibit the trained behaviors on the job. Yet, in an article by Wexley and Baldwin (1986), no differences were found between participative and assigned goal setting on transfer of training.

Research on goal setting has been extensive and consistent (Locke, 1996). First, difficult and specific goals lead to higher achievement and performance. However Locke

(1996) points out that the direct relationship assumes the individual is committed to the goal and has the knowledge, skills, and abilities to achieve the goal. Second, the effects of goal setting on performance seem to be strongest for easy tasks, and weaker for complex tasks (Wood, Mento & Locke, 1987). However, given a complex task participative goal setting enhances goal acceptance (Erez & Zidon, 1984). Once the trainee accepts the goals (given that it is specific and difficult), the goals result in higher performance as compared to easy, "do your best" goals. Monetary incentives may strengthen goal commitment, but the individual must value money (Locke & Latham, 1990a; 1990b). It seems that public commitment is more effective than private commitment (Hollenbeck, Williams, & Klein, 1989). However, it has also been shown that goal setting has weaker effects on performance for tasks that are complex as compared to simple (Wood, Mento, & Locke, 1987).

Comparing Relapse Prevention and Goal Setting.

A few studies have compared the effects of different transfer of training strategies, namely goal setting and RPT. While informative, the studies have had deficits that need to be addressed in future research, as will be highlighted.

Wexley and Baldwin (1986) looked at the effectiveness of: (a) assigned goal setting, (b) participative goal setting, and (c) a behavioral self-management approach based on the relapse prevention model, for facilitating the transfer of training. The authors had subjects attend a time management workshop, then assigned the subjects to one of the three above-mentioned post-training strategies. Wexley and Baldwin found that both the assigned and participative goal setting conditions were superior to the behavioral self-management and control conditions in inducing maintenance of behavior

change over a two month period. The researchers explained their finding with the notion of behavioral commitment, in that the more explicit or public a task-related behavior is, the greater the individual's commitment will be to the task. The goal setting condition had more elements that would be linked to behavioral commitment. However, while the researchers found significant differences between the transfer strategies utilizing self-report measures, no differences were found using observer-reported measures. These different findings were highlighted by the low correlation found between the self-report measures and the observer-reported measures. Further, as pointed out by Gist et al (1990), while many self-management programs have goal setting as a component, Wexley and Baldwin (1986) did not include goal setting within the behavioral self-management condition.

In a similar study, Tziner et al. (1991) investigated the effectiveness of a relapse prevention model on transfer of training behaviors. The relapse prevention model was compared to a control condition, which did not include a transfer of training method. While the Tziner et al. article did not include goal setting as a condition, the Tziner et al article incorporated military personnel as compared to the undergraduate subjects employed by Wexley and Baldwin (1986). Tziner et al found that trainees who participated in the relapse prevention model had higher levels of knowledge of the course content and made greater use of transfer strategies than subjects in the control condition. Further, the subjects' supervisors reported that the subjects in the relapse prevention condition made greater use of the actual trained skills. In other words, supervisors found those subjects were better at getting the job done. But again, goal setting alone was not included as a comparison in the study.

Gist et al (1990) contrasted goal setting and relapse prevention training on effectiveness in facilitating transfer of training to a novel task. Utilizing negotiation skills (a complex task) as the trained behavior, they found that skill generalization was higher among self-management trainees as compared to goal-setting trainees. Also, self-management trainees exhibited higher performance levels on a transfer task. Gist et al did include goal setting as a component of the self-management training, therefore addressing a deficit from the Wexley and Baldwin article. Yet, no control condition (i.e., no transfer of training method) was included, which is important so that researchers can identify if transfer of training methods differ with respect to task complexity. It may be that with a simple task, both goal setting and relapse prevention have no beneficial effects over that of a control condition. Also the study had a small N, making generalizability problematic. The current proposed study will provide information beyond that of the Gist study in that it will attempt to manipulate task complexity, contain a control condition, include both self-efficacy and performance measures, and have a large enough sample for generalizability.

What the above research articles suggest is that the relapse prevention training is likely a useful transfer of training method. However, the effectiveness of relapse prevention as compared to goal-setting strategies is not as clear. Goal setting has been shown to be an effective motivational strategy for transfer to training (Locke & Latham, 1984; Locke & Latham, 1990). Similarly, RPT has been shown to be an effective transfer of training strategy (Tziner et al., 1991). However, due to the conceptual and methodological flaws pointed out in the previous research, a well-balanced comparison of the two transfer of training methods is still needed. To accurately compare the two

transfer of training methodologies, we will need accurate evaluation measures. Therefore the next section will give an overview of recent work on training evaluation literature. And, again following the proposed model, the next section will lead into why an end of training measure of self-efficacy may be an accurate way of evaluating transfer of training methods.

Training Evaluation: Comparing Kirkpatrick's (1977) Model and Kraiger et al.'s Model (1993)

Training evaluation has been defined as the systematic collection of information regarding the success of a training program (Goldstein, 1986). According to Cascio (1991), an evaluation of a training program denotes a dichotomous outcome, i.e., a training program either has value or it does not. The criteria researchers have used to evaluate a training program have for the most part followed Kirkpatrick's (1977; 1987) criteria of reaction, learning, behavior, and results.

Kirkpatrick's four levels of criteria include two internal and two external criteria (Cascio, 1991). Internal criteria (i.e., reaction and learning) are those that are linked directly to performance in the training situation, while external criteria (i.e., behavior and results) are measures of actual changes in job performance. Of the internal criteria, the first has been labeled reaction criteria, which is simply a measure of the trainee's impressions or feelings about the training program (Kirkpatrick, 1976). It has been found that this type of criterion provides little if any useful information (Cascio, 1991) and may even cause more problems than benefits for an organization (Dixon, 1987). For example, reaction criteria can lead to the expectations that training should be entertaining, and lead to the idea that learning is passive activity rather than an active (Dixon, 1987). However,

reaction criteria can be a measure of the face validity of the training program (Muchinsky, 1993). Learning criteria though, can be far more useful. Learning criteria quite simply measure how much a trainee learned in the training program, and often take the form of a written exam or a performance test. In many instances, administering a pre-training and post-training learning measure can identify how successful a training program taught the training content (Cascio, 1991). Learning criteria will be discussed in further detail later in the paper.

Behavior criteria are external criteria, which are intended or designed to measure actual performance back on the job, while the second external criteria, results, is meant to assess the training program's contribution to the organization compared to its cost. The goal of behavioral criteria is to show positive transfer between what is learned within the training context and what is applied on the job. Since behavioral criteria are a measure of transfer, it is important to realize that learning criteria and behavioral criteria do not always correspond. For example, some people may perform well in training yet are unable to transfer their new knowledge or skills back to the job (Muchinsky, 1993). Results criteria involve comparing the costs of the training program with its benefits, which can be difficult to measure. While there are a variety of utility analysis equations that can be used to investigate a training program's utility (for a description of these, see Cascio, 1991), it is difficult to calculate the benefits of attitudinal training and the value of a well-trained employee. In addition, both types of external criteria can be affected by non-training factors such as reinforcement (or lack thereof) by peers and supervisors to exhibit trained behaviors (Ford, et al., 1992).

Limitations of Kirkpatrick's Evaluation Model

Kirkpatrick's (1976) training evaluation model is not guided by an underlying conceptual model of training evaluation, which contributes to its many shortcomings. These shortcoming include conceptual flaws in the model (Alliger & Janak, 1989; Clement, 1982), a lack of clarity as to what changes may be expected as a function of trainee learning, and what types of assessment techniques are appropriate given the type of trainee learning (Kraiger, Ford, & Salas, 1993). Recent work on training evaluation by Kraiger and colleagues has attempted to address the shortcomings of the Kirkpatrick model and will be discussed next.

An Alternative Training Evaluation Model: Multidimensional Learning Outcomes

Recently however, Kraiger, Ford, and Salas (1993), and Kraiger and Jung (1997), have suggested that there are many other criterion variables that can be useful for training evaluation. Kraiger et al. (1993) have proposed a much broader conceptual model of training evaluation, which assumes that learning outcomes are multidimensional. The multidimensional learning outcomes include cognitive, skill-based, and affective outcomes. Accordingly, training evaluation must take a construct-oriented approach, such that the evaluation technique matches the type of learning that has occurred within the training context. The three categories of

---

Insert Figure 2 Here

---

outcomes (i.e., cognitive, skill-based, and affective) also have different sub-categories (as shown in Figure 2), each of which can be assessed by different training evaluation methods. Each of the three main learning outcome categories will be discussed in turn.

Cognitive Outcomes.

Cognitive learning outcomes refer to variables that relate to the quantity and type of knowledge and the relationships among knowledge elements (Kraiger et al., 1993). Following Gagne's (1984) research, cognitive learning outcomes are divided into three categories, namely verbal knowledge, knowledge organization, and cognitive strategies. According to this classification scheme, it can be seen that cognitive learning outcomes focus not only on static states of trainee knowledge, but, as pointed out by Kraiger et al. (1993), focus on "dynamic processes of knowledge acquisition, organization, and application." (pp. 320). In addition, it is believed that the three categories are generally ordered chronologically, such that verbal knowledge (via recognition and recall tests) would be an appropriate evaluation measure for trainees' early in training, and that strategy-based measures (e.g., self-reports, probed protocol analysis) would be a more appropriate evaluation measure for more advanced trainees. The aforementioned different evaluation measures of cognitive learning outcomes can be contrasted with the traditional simplistic achievement test of knowledge acquisition (Gagne, 1977). Instead of simply administering an end-of-training multiple-choice or true/false questionnaire that measures declarative knowledge, cognitive learning would be measured at different points during the training process, mirroring the dynamic nature of cognitive learning.

Skill-Based Outcomes.

Skill-based outcomes are concerned with the development of technical or motor skills. Skill development is theorized to follow three general stages; (1) initial skill acquisition, (2) skill compilation, and (3) skill automaticity (Anderson, 1982). According to theories of skill development, it is believed that there is a transition from declarative knowledge to procedural knowledge. Declarative knowledge, considered the simplest form of knowledge, is comprised of propositions and can be conceptualized as "knowing about things" (Wideman & Owsten, 1993). While declarative knowledge looks to be memory-based, performance is often awkward and requires continuous review to see if recall of information is correct (Anderson, 1982; Gist, 1997). Procedural knowledge indicates that performance is automatic; minimal effort is needed to recall facts or to think about the sequencing of events or facts (Gist, 1997). Once knowledge is procedural, the trainee is then able to reproduce the trained behaviors. Next, with practice, the learned skills become compiled, such that skills are faster and more fluid than at the beginning of training. Trainees make fewer errors, their behaviors are more task-oriented, and they need less verbal rehearsal. With continued practice, the skills may reach a level of automaticity; where trainees are able to perform parallel activities and are more able to decide which skill is appropriate for different situations (Gagne, 1986; Shiffrin & Dumais, 1981). According to Kraiger et al. (1993), skill development has traditionally been evaluated via performance in role-plays or in actual job behavior. Whereas behavioral observation is still thought to be useful as an evaluation technique, the authors have identified other, relevant assessment methods. For example, to test automaticity, it would be appropriate to use such evaluation methods as interference

problems (e.g., a problem that resembles a normal problem but that has key information altered) and secondary task performance measures (e.g., performing the trained task while simultaneously performing a secondary task).

Affective Outcomes.

While Kraiger et al.'s (1993) skill-based outcomes can be seen as an extension of Kirkpatrick's learning and behavioral criteria, Kraiger et al.'s final category concerns affectively based learning outcomes, a category of learning outcomes not considered by Kirkpatrick's model. Again following Gagne's (1984) work, attitudes are defined as an internal state which influences personal action. However, Kraiger et al. broadened the perspective of attitudinal learning outcomes so that affectively based learning outcomes includes constructs such as motivation, attitudes, and goals that are relevant to training program objectives. While affective outcomes may sound similar to Kirkpatrick's reaction criteria, the foci of the two are different. Whereas Kirkpatrick's reaction criteria are focused toward the training program itself, affective outcomes reflect an internal state of the trainee. The two main constructs involved with affective outcomes are attitudinal and motivational outcomes.

As reported by Feldman (1989), training programs not only teach and impart knowledge and skills, but can also serve as socialization agents (e.g., police recruits). In other words, training programs often try to explicitly change a person's attitudes. There are many training programs which attempt to influence the valences of a trainee, such as safety training programs which attempt to change the valences trainees' attach to safe behaviors (Gregorich, Helmreich, & Wilhelm, 1990). Kraiger et al. (1993) suggest self-

report measures for evaluating attitudinal changes, but reminds researchers to measure the direction of feelings toward the attitudinal object and the attitudinal strength.

Motivational outcomes are the second class of affectively based learning outcomes defined by Kraiger et al. (1993). However, the authors state that motivational outcomes tend to be a secondary training outcome, or in other words, expected but not an explicit part of training (though still considered important). According to the authors, there are three types of motivational outcomes, two of which are of particular interest to the current study. The first type of motivational outcome is motivational disposition. Dweck (1986) and Dweck and Elliot (1983) theorized that there are two types of motivational disposition, a mastery orientation and a performance orientation. A mastery orientation shows a concern for increasing one's competence to the current task, while a performance orientation shows an intention to do well and to gain positive evaluations from others. Research has shown that performance and mastery orientations can be characterized as a general motivational tendency, and the superior learners can adopt the orientation that is most appropriate to the current context (Biggs & Rihn, 1984). Again, Kraiger et al. (1993) suggests self-report measures for evaluating performance and mastery orientations.

The second outcome highlighted by Kraiger et al. (1993) is that of goal setting. According to Locke and Latham (1990), the mechanisms presumed to operate through goal setting are direction, arousal, and persistence of effort. These mechanisms also characterize motivated behavior. Kraiger et al. theorizes that there will be variability among trainees in the difficulty, complexity, and specificity of their goals. Specifically, they suggest that goal quality is a useful indicator of a trainee's development. Following

evidence from Glaser (1986), they note that experts and novices differ in their goal clarity and specificity, such that experts have well-differentiated, hierarchical goals as compared to novices. The authors suggest that measuring goal commitment as a surrogate of goal acceptance (Locke, Latham, & Erez, 1988), and to assess a trainee's goal structure as means for evaluating trainees' goals.

The final type of motivational outcome described by the authors is self-efficacy. According to Bandura (1977), self-efficacy is one's perceived performance capabilities for a specific task or activity, and the link between self-efficacy beliefs and task performance has been well-documented (Barling & Beattie, 1983; Stumpf, Brief, & Hartman, 1987). While self-efficacy is described as a secondary training outcome by Kraiger et al. (1993), they do acknowledge that enhanced self-efficacy can be a primary training objective. The authors give the example that sports psychologists believe that both self-efficacy and performance expectancies are important determinants of later success (Feltz & Doyle, 1981; Feltz & Weiss, 1982). The authors provide evidence and theory from Bandura (1986) and Marx (1982) that self-efficacy likely predicts long-term transfer or skill maintenance. As with the other affective outcome, the authors suggest the use of self-report measures in evaluating a trainee's self-efficacy.

Conclusions on Kraiger et al.'s Training Evaluation Model.

However, not only have Kraiger et al. (1993) set up a new classification scheme, but they have also allowed for new ideas for evaluating training programs through a variety of methods. So instead of relying just upon Kirkpatrick's four levels of criteria, we should examine the goals of training to help us evaluate the instructional objectives (Kraiger & Jung, 1997).

Transfer of training is the extent to which behaviors learned in training can be applied on the job (Cascio, 1991; Tziner et al., 1991). Transfer of training evaluation studies have generally looked at if transfer strategies (mostly goal setting) help to increase the amount of trained behaviors that are exhibited on the job. More recently, studies have been conducted that compare two different types of transfer strategies, goal setting and RPT (Gist, Bavetta, & Stevens, 1990; Wexley & Baldwin, 1986). Both Gist et al (1990) and Wexley and Baldwin (1986) have used Kirkpatrick's behavior criteria as the criteria of interest. While highly appropriate, the work by Kraiger and colleagues and work by Locke and Latham (1990) on work motivation can allow us to highlight other criterion variables that can further help us to evaluate the goal setting and RPT transfer of training methods.

Kraiger et al (1993) have defined affectively based outcomes as a class of variables that include attitudes, motivation, and goals that are relevant to the objectives of the training program. In addition, Kraiger et al (1993) noted that enhanced self-efficacy could be a primary training objective. This directly maps onto the statement by Marx (1982) that an individual trained in RPT should feel an increased perception of self-efficacy on a task. Therefore, before using on-the-job performance measures to evaluate transfer of training methods, it may be useful to look at trainees' self-efficacy of successfully transferring their learned behaviors as a transfer of training evaluation criterion measure. The problems that occur with on-the-job, post-training training evaluation measures may support investigating end-of-training self-efficacy evaluation measures.

The Timing of Training Evaluation: A Brief Overview of the Problems Associated with Post-Training Evaluation

A current issue in the training evaluation literature concerns the timing of training assessment. As illustrated by Ghodsian, Bjork, and Benjamin (1997) and Bjork (1994), post-training measures of on-the-job performance, while potentially the most valid measures of a training program's effectiveness, are fraught with problems. Some of the practical problems are that a) trainers often do not have access to the trainees once training is completed, b) those responsible for collecting post-training on-the-job assessment information may lack the necessary resources to do an adequate job, and c) being tested on the job may cause apprehension, and therefore performance decrements, by those being evaluated and may hinder normal operations. In addition to these practical problems, there are also institutional impediments. If job performance analysis reveals inadequate training, those responsible for training may face legal and/or financial penalties. Also, if an employee is performing below an expected level, there may be pressure to retrain the employee. However, the costs to the organization of re-training an employee may be prohibitive. In both cases, management often settles on a policy of ignorance and chooses to remain unaware of the deficiency, "under the assumption that what you don't know will probably hurt you less than what you might find out" (Ghodsian, et al, 1997, pp. 65).

The problems associated with post-training assessment has led Ghodsian et al. (1997) to ask if there are measures available during training that would indicate the degree to which long-term goals of training are being met. One of the goals of the current study is to look at the differential effects of transfer of training methods on an

individual's self-efficacy, and also see if self-efficacy is then related to performance. Therefore, it may be appropriate to further define the construct of self-efficacy.

Self-Efficacy and Training Effectiveness

As defined by Bandura (1977), self-efficacy is an individual's judgment that (s)he can successfully accomplish or perform a given task. Those individuals who believe that they can perform a certain task well actually do perform better on the task than those who think they will fail (Gist & Mitchell, 1992). Gist and Mitchell (1992) in their theoretical analysis of self-efficacy, suggest that a person's self-efficacy is a superordinate judgment of performance capability, which is produced through the assimilation and integration of multiple performance determinants. In other words, self-efficacy is developed via four categories of experience, namely personal attainments, vicarious experiences (such as modeling), verbal persuasion, and different types of physiological arousal, such as anxiety (Bandura, 1986). The authors suggest that there are three types of assessment processes involved. The first assessment process is the analysis of task requirements. The analysis of task requirements produces inferences about what it will take to perform at various levels of effectiveness at the task. The requirements analyzed may include both the skills that will be needed and the time it will take to complete the task. When the task is novel, the task analysis should be most explicit. When the task has been performed frequently in the past, the individual will rely more on their interpretation of the causes of previous performance levels on the task. This leads to the second form of analysis, an attributional analysis of experience.

The attributional analysis of experience involves judgements or attributions as to the causes of past performance levels. For example, a person may believe "I've done

good forecasts in the past which I attribute to my math skills and/or my hard work" (Gist & Mitchell, 1992, pp. 189). Though personal experiences likely provide the strongest information for attributional analysis, other experiences such as modeling or persuasion can provide causal information via symbolic coding. According to Decker (1980), via symbolic coding processes an individual may view model performing the task and deduce the relevant skills and behaviors needed. In addition, the individual can then approximate the extent of similarity of the skills and behaviors of the model and their own skills and behaviors. Finally, Gist and Mitchell (1992) suggest that individuals then assess personal factors (e.g., skill level, anxiety, desire, available effort) and situational factors (e.g., competing demands, distractions) to assess their possible effect on future performance. In this way, the individual assesses the availability of resources and constraints on performing the presented task at different effectiveness levels. These assessments then are used in a summary-level judgment, which defines self-efficacy (i.e., the estimation of orchestration capacity).

It has been found that self-efficacy is associated with an individual's commitment to a goal, and can be increased via practice, modeling, and persuasion (Cascio, 1991; Bandura, 1986). The self-efficacy literature, according to Noe (1986), suggests that if trainees believe that they can learn the training material (effort-performance), and believe that desirable outcomes will be the result of learning the training material (performance-satisfaction), then trainees will have a higher motivation to learn the knowledge, skills, and behaviors taught in the training program. It has been suggested that self-efficacy is a critical element for success in relapse prevention training (Annis & Davis, 1989). What

the previous discussion on training evaluation and self-efficacy has highlighted is that it is critical to assess an individual's self-efficacy both prior to training and post-training.

The Roles of Locus of Control and Task Complexity on Training Effectiveness

As the paper has followed the hypothesized model, I have discussed the roles of transfer of training method, current thought on training evaluation, and the role of self-efficacy within the training paradigm. However, a discussion on other constructs that can influence training effectiveness is still needed. As the model shows, the constructs of locus of control and task complexity, and their influence within a training context, leads into the next section.

Locus of Control and Training Effectiveness.

In general, locus of control is a person's generalized expectancy about the causes of reinforcements and outcomes. This generalized expectancy reflects a unidimensional continuum, from internal to external (Lefcourt, 1991). The focus of the construct locus of control, then, is the perceived contingency between actions and events. As defined by Rotter (1966), individuals who have an internal locus of control are more able and willing to assume control, and believe that success or failure is dependent on their own actions, and therefore under their personal control. In other words, the person believes that their actions, characteristics, and qualities are the determinants of their experiences.

Those who can be categorized as having an external locus of control, on the other hand, are more likely to see success or failure as a function of the work environment, and therefore out of their personal control (Lefcourt, 1991; Noe, 1986). Individuals identified as having an external locus of control are more likely to see their outcomes as being determined by luck, the social context, other persons, etc (Lefcourt, 1991). Therefore,

those individuals who have a more external locus of control would likely be less motivated to participate in a training program, and see the likelihood of success of the training program as low. Individuals identified as having an internal locus of control may show greater effort to learn the training content and skills than individuals identified as having an external locus of control, which may be due to internals believing that mastering the training program is within their own control (Noe, 1986).

The Relationship Between the Training Task and Training Effectiveness: The Role of Task Complexity.

According to Wood (1986), the complexity of a task has been shown to vary on components (the number of subparts the task includes), coordination (sequencing or relationship of the parts), and dynamics (changing nature of the task or task environment). Complex tasks therefore typically involve multiple information cues or parts, a high degree of coordination between the cues or parts of the task, and changing relationships between the cues or parts (Korsgaard & Diddams, 1996; Wood, 1986). Therefore, as the number of acts an individual must perform increases, the knowledge and skill requirements for a task also increase (Argote, Insko, Yovetich, & Romero, 1995; Wood, 1986). Examples of complex tasks includes many managerial duties and responsibilities (Mathews, Mitchell, George-Falvy, & Wood, 1994), certain emergency medical care tasks (Xiao, Hunter, MacKenzie, Jefferies, Horst, & Lotus Group, 1996), and tasks germane to machinists, engineers, architects, and decision makers (Ehigie, 1994).

Recent work has shown that goal setting is more effective with simple tasks than for complex tasks (Earley, 1985; Wood, Mento, & Locke, 1987). For example, Wood et

al. conducted a meta-analysis on 125 goal setting studies and looked at the relationship between the complexity of the tasks and the size of the goal-setting effect obtained. The authors found the average effect size for goal setting was significantly larger on simple tasks as compared to complex tasks. Goal setting has been theorized to produce direct, motivational effects, such as increased effort, attention, and persistence, which in turn have been used to explain the increased performance on simple tasks (Kernan, Bruning, & Miller-Guhde, 1994). However, as tasks become more complex, these universal plans (increased effort, attention, and persistence) and automatic task-specific plans become progressively less useful (Kernan et al., 1994). In addition, what has been shown is that assigning difficult goals on complex tasks may actually cause performance decrements as compared to assigning no goals at all, due to creating anxiety that can interfere with effective strategy search processes (Earley, Connolly, & Ekegren, 1989). It has been suggested that an indirect or cognitive strategy component (such as that contained within a relapse prevention model, and shown in Appendix A) can play an important role in determining successful performance on a complex task (Kernan, et al., 1994). Therefore, if difficult goals possibly cause performance decrements on complex tasks while cognitive strategies facilitate performance on complex task, it is hypothesized that relapse prevention will be superior to goal setting on complex tasks. And based upon the review of the literature already cited, there should be no differences between goal setting and relapse prevention on simple tasks.

Hypotheses

The suggested conceptual model and literature review allows for rather straightforward hypotheses:

1. Transfer of training method will be significantly related to later task performance, such that trainees who have received goal setting or RPT will have higher levels of performance than those in the control condition. This relationship will be the basis for testing the moderating and mediating effects of subsequent hypotheses.

2. Self-efficacy will partially mediate the transfer of training method and task performance relationship. In order for self-efficacy to be a mediator in the relationship, the following sub-hypotheses must hold true.

   A. Transfer of training method will be significantly related to changes in self-efficacy, such that RPT will produce larger increases in self-efficacy than goal setting, and goal setting will produce larger increases in self-efficacy than the control condition.

   B. Transfer of training will be significantly related to task performance. This is the same as hypothesis one.

   C. Increases in self-efficacy will be positively related to task performance, such that the higher the reported increase in self-efficacy, the higher the later task performance.

   D. The strength of the relationship between transfer of training method and task performance will be significantly reduced after controlling for increases in self-efficacy.

3. Task complexity will moderate the transfer of training and performance relationship. Specifically, goal setting and RPT will be equally effective in producing higher levels of task performance than the control condition,

for a simple task. On the complex task, RPT will produce higher levels of performance than goal setting, while goal setting will similarly produce higher levels of performance than no transfer of training method. The form of the interaction is shown in Figure 3.

4. Task complexity will also moderate the transfer of training and self-efficacy link. Goal setting and RPT will be equally effective in producing higher levels of self-efficacy than the control condition, for a simple task, but on the complex task, RPT will produce higher levels of self-efficacy than goal setting, and goal setting will produce higher levels of self-efficacy than no transfer of training method. The form of the interaction is the same as is shown in Figure 3.

5. Locus of control will also moderate the transfer of training method and task performance relationship. RPT will be more effective than goal setting, and goal setting will be more effective than the control condition for individual's indicating an internal locus of control, while there will be no differences among individual's with an external locus of control.

METHOD

Design

A between subjects, 2 (complex task vs. simple task) X 3 (no transfer of training, goal setting, or RPT) longitudinal design was utilized. Trainees were given up to three weeks to finish their task.

Participants

Participants were psychology undergraduates from a PY100 subject pool and other psychology courses from which the subjects may acquire extra credit. All participants were required to have a university email account (which is granted to all Colorado State University students) and to not already have a personal web page. One hundred and fifty four participants (72 male, 82 female) completed the training session. Each training session averaged 10.7 participants per session, with a standard deviation of 3.85 (minimum = 3, maximum = 17). Of the total participants, 109 finished their web pages. Table 1 shows the breakdown of participants per cell, while Table 2 shows the power analysis levels (Cohen, 1977) for the main effects and interactions.

Procedure

Upon arrival to the experiment participants were asked if they met the requirements of the experiment, namely if they had a university email account and did not already have a personal web page. The participants who met the requirements were then given a survey questionnaire. They were asked to fill out the first section, which included demographic information, prior knowledge with computers and the Internet, and a locus of control measure. Following the survey, participants were given a verbal description of the task on which they were to be trained (construction of a personal web page), and asked to fill out the next section of the survey which included questions about their self-efficacy toward the task. The participants were then trained on the task. Immediately following the task training (and prior to the transfer of training method), participants completed a section on the questionnaire which measured a manipulation check on the complexity of the task. Participants were then given the transfer of training

method, except for the control groups, who were asked to complete the next section of the survey. All participants were told they had three weeks to email or telephone the head researcher with their web page address, while participants in the goal setting and relapse prevention conditions were given more stringent time constraints as part of the goal setting methodology, with three weeks being the deadline. Participants in the control condition were told to finish the task as soon as possible. At that point, all participants were asked to fill out the final section of the survey, which again asked them about their self-efficacy toward being able to perform the task. In addition, the final section of the survey asked about what possible obstacles could prevent the participants from finishing their web page. All participants spent two hours in the training session (to be described later). After the researcher received the participants' email address, the researcher looked up the participants web page and scored an objective performance measure.

Materials

Tasks. One set of subjects was trained on a simple task, while the other set was trained on a complex task. Following the definition of simple versus complex tasks and the manipulation of task complexity in previous research (Puffer & Brakefield, 1989; Argote, et al., 1995; Kernan et al., 1994; Mathews et al., 1994) the two tasks were similar but differed on components (number of elements in a task) and coordination (the number and nature of the relationships between the elements). Specifically, the task involved the development of a personal web page. The simple condition involved relatively few elements and no coordination between the elements in the web page, while the complex condition involved developing a web page with many elements and coordination between

the elements of the web page. Pretesting was conducted to assess the adequacy of the task complexity manipulation. For the pretest, two groups of research participants were each given a written and verbal description of one of the tasks (simple or complex). The participants were then asked to rate the perceived complexity of the tasks using a complexity scale based on the work of Wood (1986) and Kernan et al (1994). Reliability of the complexity scale was .85. No one who participated in the pretesting later participated in the experiment. The description of each task and the accompanying complexity scales to be used can be found in Appendix B. A significant difference in the complexity ratings were found, such that participants (N = 8 per group) rated the simple task (mean = 3.34, S. D. = 1.06) significantly lower ($p < .10$) than participants in the complex task (mean = 4.22, S. D. 0.47). During the actual experiment, a manipulation check on the task complexity was employed using the same complexity rating scale used during pretesting.

Training method

Participants were given the task training and then trained in one of the transfer of training methods: a goal-setting training method (Locke & Latham, 1984; Locke & Latham, 1990), or a relapse-prevention training method (Annis & Davis, 1989; Marx, 1982; Miller, Carmona, & Leukefeld, 1993), depending on which condition they were randomly assigned. A third group was only given the task training and answered survey questions. Participants were given the task training while seated in front of a personal computer, while a trainer showed the steps of building a personal web page on a computer screen projected so that all participants could follow along. Research assistants blind to the hypotheses in the study were trained on how to train others in goal setting

and relapse prevention. The research assistants were given scripts to follow and allowed practice sessions. The research assistants then trained the participants on building a web page and the transfer of training methods. The goal setting and relapse prevention conditions were manipulated following the methodology used by Gist et al (1990), the scripts for which can be found in Appendix A. In order to keep time spent in training equivalent across all training sessions, all subjects (control, goal setting, relapse prevention) spent approximately two hours in the training session. Participants in training conditions that ended before two hours were instructed to go to a web site and complete a timed crossword and (if needed) timed word search puzzles until they had spent two hours in the training session.

Goal Setting. Trainees in this condition were given an overview of the goal setting process and a definition of appropriate goals. Subjects were told the characteristics of effective goals (i.e., challenging and specific), why these types of goals are effective, and examples of goals that a person could set. Examples of challenging versus easy goals were discussed, as well as specific versus vague goals. After discussing the rational for goal setting and the types of goals that a person could set, subjects were given a suggestion as to a possible difficult and specific goal (such as completing the web page and informing the lead researcher within one week). After giving the suggested goal, discussion was encouraged to discuss the goal and make changes if the trainees felt it was necessary. All cells that included goal setting (which includes relapse prevention cells) maintained the one-week goal.

Relapse prevention. Subjects in the relapse prevention also received the overview and discussion of goal setting, similar to those subjects in the goal setting condition.

After setting goals, they were presented with a discussion of relapse prevention techniques. First, subjects were told that occasional "slips" or "relapses" are an inevitable and expected part of training, and that therefore they needed to plan for such a situation. Further, these relapses do not mean they failed at their training but that they must exercise the relapse prevention skills that they discussed. The second phase of the relapse prevention training was to ask subjects to identify obstacles that could interfere with them being able to exhibit their newly trained behaviors. Third, subjects developed plans for overcoming these obstacles. Fourth, subjects were told that they need to self-monitor progress in the implementation of their plans, with a discussion on how to self-monitor. Finally, the subjects were trained on how to self-reinforce themselves for interim accomplishments. Examples for each relapse prevention step were solicited from the training group.

Measures

Demographic information. General demographic information was collected, including sex (72 males, 82 females), age (mean = 18.93, S. D. = 2.15), current overall GPA (mean = 3.26, S. D. = .47), college major, and year in college (mean = 1.53, S. D. = .99). There were 41 subjects who did not report a GPA, and for the most part they were freshman who had not yet recorded a college GPA.

Computer/Internet knowledge and experience. Participants were asked a variety of questions pertaining to their computer and Internet experience. The questions included whether or not they own or use a computer, what type of computer they most commonly used, how often per week they used a computer for any type of task, self-described level of computer expertise, how often per week they used the Internet, if they have ever

designed their own web page before, and their preferred method of learning new material. Computer and Internet use per week were measured on a five point scale (1 = Never to 5 = Very Often), while computer expertise was measured on a similar five point scale (1 = Novice to 5 = Expert). The results for each question can be found in Table 3. Table 5 shows that computer use per week, Internet use per week, and computer expertise all did not have a significant relationship with the dependent variables; however, the previous questions were all still used as covariates in certain analyses. Table 6 indicates that the type of computer the participants usually used and preferred learning method also did not have significant relationships with the dependent measures.

Locus of control. Rotter's (1966) 29 item internal-external locus of control measure was used, with a low score indicating highly internal locus of control, and a high score indicating highly external locus of control. The mean locus of control score was 10.23 (S. D. = 3.7), with an alpha of .69.

Self-efficacy. According to Gist and Mitchell (1992; and as discussed by Locke, Frederick, Lee, & Bobko, 1984), self-efficacy can be measured by summing the confidence ratings a subject believes they can perform at several specific levels on a specific task. Further, according to Gist and Mitchell (1992) "the predictive validity of self-efficacy is well established, and predictive validity is part of the overall construct validity" (pp. 187; Cook & Campbell, 1979). Therefore, a five item measure assessing the subjects' confidence that they could construct a web page on varying levels of expertise (i.e., very poor, below average, average, above average, excellent) was given for each of the two tasks. The subjects answered yes or no to each question, and for each question they answered "yes," they then gave a confidence rating (10 to 100). The

confidence ratings were then summed to calculate an overall self-efficacy rating. Cronbach alpha reliabilities were .81 for the pre-training self-efficacy scores, while the post-training self-efficacy reliabilities were .83. Table 4 shows the pre and post self-efficacy scores by method and task.

Performances measure (Skill-based outcome). Of the 154 participants who attended a web page training session, 109 participants finished their web pages (70.8%). Post-training performances were measured along two dimensions. The first dimension was a time measure, such that the number of days after the training session the task was completed was recorded (mean = 10.03, S.D. = 6.24). The second dimension of performance was a quality dimension, such that a percentage number was given. The percentage number was based on the total number of elements the individual had contained within their web page divided by the total number of required elements as instructed during the training session (mean = 79.5 %, S. D. = 22.6 %). Also, if participants included additional, non-required elements, that was also noted. Of the people who completed their web page, 56.9% of participants included additional elements.

Obstacles to completing the task (Manipulation check). Participants were asked an open-ended question concerning what types of obstacles may prevent them from completing their web page task. It was expected that participants in the relapse prevention condition would indicate more possible obstacles to completing the task. Participants in the control group gave an average of 2.21 obstacles (S.D. = 1.38), goal setting participants gave an average of 2.58 obstacles (S.D. = 1.62), and relapse prevention participants gave an average of 2.83 obstacles (S.D. = 1.72). The averages

were not statistically significant, which indicated that the training groups did not report a different number of obstacles. The implications of this finding are explored in the discussion.

Task complexity (Manipulation check). Four statements, based on the research by Wood and colleagues, were given to the trainees that assessed their perception of the complexity of the task (alpha = .77). Participants responded to the statements on a five point scale (1 = Do not agree to 5 = Completely agree). The scale can be found in Appendix B. Participants trained on the simple web page gave an average complexity rating of 3.65 (S.D. = .91), while the participants in the complex web page training gave an average complexity rating of 3.85 (S.D. = .70). The averages were not statistically different (p = .138). Differences were not found in the ratings of task complexity, which would indicate that the complexity manipulation did not work as intended. However as will be shown, analysis and results concerning task complexity will lead to the conclusion that the task complexity manipulation did work as intended.

The complete survey can be found in Appendix C.

RESULTS

Table 5 shows zero-order correlations for dependent measures of interest. Given that some participants finished their web pages and others did not, logistic regressions were conducted to see if there were differences between the cells in the rate of completing the web pages. While training method did not predict completion of the web page, task complexity did predict whether a participant finished their web page. The logistic regression showed that participants who were trained on a simple web page were 3.24 times more likely to finish their web page than participants who were trained on a

complex web page (95 % C.I. = 2.50 to 3.98, p = .002, R^2 = .04). There was no method by task interaction effect. The different rate of completion between participants who were trained on the simple web page versus the complex web page suggest that the task complexity manipulation did work, contrary to the findings of the task complexity manipulation check scale.

Hypothesis 1: Main Effect for Training Method

The first hypothesis that there would be a training method - performance relationship was not supported. An ANCOVA (using computer use, internet use, computer expertise, and number of obstacles identified as covariates) showed that training method did not have a significant relationship with speed of completion (effect size = .01). Similarly, a separate ANCOVA (same covariates as above) showed that training method did not have a significant relationship with quality of the web page (effect size = .002). The findings were in the hypothesized directions, but not of strong enough magnitude to be significant. The ANOVA tables can be found in Table 7, while the means, and standard deviations can be found in Table 8.

Hypothesis 2: The Mediating Effect of Self-Efficacy Between Training Method and Task Performance.

Given hypothesis one was not supported (i.e., training method was not related to task performance), hypothesis two, that self-efficacy would partially mediate the training method and task performance relationship, did not meet conditions to be tested. However, analyses were conducted on each of the sub-hypotheses of hypothesis two in order to gain a more complete understanding of the results.

Hypothesis 2-A

Hypothesis 2-A suggested that training method would be significantly related to changes in self-efficacy. To test this hypothesis, an Analysis of Covariance (ANCOVA) was conducted. Using post-training self-efficacy scores as the dependent measure, pre-training scores as the covariate, and training method as the independent variable, Table 9 indicates that training method did not predict changes in self-efficacy scores.

Hypothesis 2-B

Hypothesis 2-B is the same as hypothesis one, which was not supported

Hypothesis 2-C

Hypothesis 2-C suggested that increases in self-efficacy would be related to task performance. To investigate this hypothesis, two hierarchical regressions were conducted, one using speed as the dependent measure and one using quality as the dependent measure. For both hierarchical regressions, pre-training self-efficacy was entered first, then post-training self-efficacy was entered. Table 10 shows that there is no support for hypothesis 2-C.

Hypothesis 2-D

Hypothesis 2-D, which was suggested that the strength of the relationship between the transfer of training method and task performance would be significantly reduced after controlling for increases in self-efficacy, was not tested, since hypotheses 1, 2-A, 2-B, and 2-D were all not supported.

Hypothesis 3: Task Complexity Moderates the Training – Performance Relationship.

To test hypothesis three, two ANCOVA tests were performed (again using computer use, internet use, computer expertise, and total number of possible obstacles as covariates). The first ANCOVA, shown on Table 11, used speed as the dependent variable of interest with task complexity and training method as the independent variables, while the second ANCOVA, shown on Table 12, used quality as the dependent variable of interest (with the same independent variables). While there were no differences between the groups on the speed performance dimension, Table 12 shows that there was a task complexity main effect for quality of performance. Participants who were trained on the simple web page tended to score higher on quality (Mean = 84.47, S. D. = 20.60, 95 % CI = 79.24 to 89.70, N = 62) than participants who were trained on the complex web page (Mean = 73.02, S. D. = 23.69, 95 % CI = 66.07 to 79.98, N = 47). Therefore, since an interaction was hypothesized and only a main effect was found, it is concluded that there was no support shown for hypothesis 3.

Hypothesis 4: Task Complexity Moderates the Training – Self-Efficacy Relationship.

First, paired t-tests and an ANCOVA's were performed to test hypothesis. First, as can be seen in Table 4, a paired t-test showed that there were differences between pre-task self-efficacy and post-task self-efficacy, such that self-efficacy did increase after training. An ANCOVA was then conducted, using post-training self-efficacy as the dependent measure, pre-training self-efficacy as the covariate, and training method and task complexity as the independent variables of interest. Table 13 shows the ANCOVA table while Table 14 shows the mean differences by each cell. A task complexity by training method interaction was found, which can also be seen in Figure 4. A Tukey

multiple comparison test indicated that the only two groups that differed were the simple task – relapse prevention group and the complex task – relapse prevention group. While there was a large increase in self-efficacy for the simple task – relapse prevention group, there was a large decrease in self-efficacy for the complex task – relapse prevention group. No other two groups significantly differed. Therefore, partial support was found for hypothesis 4.

Hypothesis 5: Locus of Control Moderates the Training – Task Performance Relationship.

Finally, hypothesis five was tested via two hierarchical regression since locus of control was measured along a 0 to 20 scale. Computer use, Internet use, computer expertise, and number of obstacles identified were entered first into a regression analysis, then training method was dummy coded and entered into a regression analysis along with locus of control to predict the performance dimensions. As seen on Table 15 (for speed) and Table 16 (for quality), no main effects or interactions were discovered, therefore hypothesis 5 was not supported.

DISCUSSION

The results indicated that transfer of training method did not significantly predict the performance outcomes, which were speed (number of days to complete task) and quality (percentage of required elements). While the means of the experimental groups were in the hypothesized direction, the magnitudes of the differences were too small to be statistically significant. Given that there was not a main effect of transfer of training method on the performance elements, the hypothesized mediating and moderating model

therefore could not be tested. Some possible reasons for the nonsignificant findings are discussed below, and ideas for future research are offered.

The possibility that transfer of training method does not have an effect on performance on a task must be considered. Since the web-page completion rate between the training methods was equivalent, it is not the case that unequal cells are the cause of the non-significance of the transfer of training methods. It may be that it is the task itself, rather than the training method, which determines a person's performance on the task. Since it was found that task complexity had significant relationships with a) whether or not a person finished the task, and b) the quality of their web pages, such a conclusion would be warranted. However, given the theoretical background and research literature of transfer of training strategies, we should consider other explanations.

It could be argued that the task presented to the participants, building a web page, is inappropriate for transfer of training techniques. There may not be adequate availability for a so-called "relapse" to occur, so that the relapse prevention training could produce an effect. However, I believe that the task was appropriate. Completing a web page was chosen as the task based on a number of factors; these factors addressed deficiencies in past research and met the needs for manipulating task complexity. First, the completion of a web page has very set boundaries; either the participant completes the page or does not complete the page. Second, the task allowed for very measurable outcomes; how quickly they completed the page and the number of required elements contained within the page. This also covered deficiencies in previous research in that self-reports of behaviors were not utilized, since all performance measures were objectively scored. Third, the task was easily manipulated according to the definitions of

task complexity defined by Wood and colleagues (1987). Finally, as compared to previous studies that employed negotiation skills as a task, constructing a web page does not rely at all on another person's skills on the task. All of these factors suggested that training relapse can occur on this task. I suggest that task complexity manipulation was much stronger than training manipulation, therefore prohibiting training effects to manifest themselves. As noted, the experimental means of the transfer of training groups on the performance dimensions are in the expected direction. The participants in the relapse prevention groups tended to complete their web pages sooner and have greater quality than participants in the goal setting and control groups, though not to a statistically significant degree.

Another issue to consider with the task is that the "simple" task could also be considered as somewhat complex. The mean complexity rating of the simple task is still quite high, and is not statistically different from the complex task. Interestingly, even though the manipulation check showed no differences between the simple and complex tasks, the results indicated that there were differences between the simple and complex tasks on whether or not a person finished the task and the quality of the web pages. These finding suggest that the task manipulation, as based on the work of Wood (1986) and colleagues, may have worked. In other words, the assessment of the manipulation of complexity may not have been accurate, but the actual manipulation of complexity may have been completed successfully. It may be that the complexity of the simple task was more of an "intermediate" complexity level, rather a simple task.

Overall, the findings of this study build some intriguing links to the literatures reviewed. Some interesting findings concerning the self-efficacy measures should be

highlighted. One is that neither self-efficacy measure (pre-training and post-training) had a significant relationship with the performance dimensions. This finding is contrary with previous work by Bandura (1977) and Gist and Mitchell (1992). If self-efficacy is a superordinate judgment of task performance, as suggested by Gist and Mitchell (1992), it may be that the overall judgement of performance is not related to the performance dimensions. The authors theorize that there are three types of assessments made in forming a person's self-efficacy, and therefore it may be that only one of these assessments are related to the performance dimensions in the study. For example, Gist and Mitchell suggest that when a person is confronted with a novel task, the assessment process labeled "task analysis" should be the most explicit. When individuals have more experience with a task, an attributional analysis of experience becomes a larger factor. As discussed in the literature review, the third assessment process is one of personal factors. It may be that if we could have separated the three assessment processes of self-efficacy, we would have seen that task analysis was related to the performance dimensions, while the other two assessment processes were not related. If that were the case, then an argument for why the overall self-efficacy measure was not related to performance could be raised. This suggestion highlights one direction for future research.

The second finding concerning the self-efficacy measures is the relationship between the self-efficacy measure and the training methods. First, we do see that overall, self-efficacy increases after training, which has been seen in numerous studies. Secondly, when we look at the paired t-tests from Table 4, we do receive partial support for hypothesis 2-A. For both types of tasks, the control training method does not

significantly increase the participant's self-efficacy. For goal setting though, self-efficacy is significantly increased for both types of tasks, while for relapse prevention self-efficacy increases significantly for only the simple task. These finding definitely supports the belief that transfer of training methods do help increase an individual's self-efficacy toward the training material, yet may not translate into performance changes.

The finding of most interest is in the multiple comparison between the cells. It was found that only the relapse prevention cells (simple vs. complex) significantly differed. It was found that for the relapse prevention – complex task cell, self-efficacy actually decreases. This finding lends credence to some arguments that relapse prevention training might actually decrease a person's self-efficacy (Hesketh, 1997), and therefore lead to lower post-training performance. This is consistent with the finding that the relapse prevention groups listed more possible obstacles to completing their web pages (though not significantly) than participants in the goal setting and control conditions. There is a basis for concern regarding the overall usefulness of relapse prevention. However, it is suggested here that although there was a decrease in self-efficacy for RPT using a complex task, a negative assessment of RPT may be premature. The pre-training self-efficacy scores for this group were unusually high; in fact much higher than any other group. Perhaps with many more participants, this high self-efficacy score would decrease. A second explanation is that perhaps for this type of situation, self-efficacy may at first decrease but at a later time period increase. In other words, the decrease in self-efficacy may only be short-term, temporary finding.

The findings of this study give further evidence of the importance of task complexity, specifically how Wood (1986) has defined task complexity. This study

manipulated task complexity according to components and coordination, two of the key task complexity factors highlighted by Wood (1986; the other task complexity factor being dynamics). We saw that changing the task on its components and coordination influenced the speed, quality, and completion rate of the task. What we did not see, as suggested by Earley (1985) and Wood et al (1987) was a interaction between task complexity and training method. Specifically, the researchers showed evidence that goal setting is more effective for simple tasks than for complex tasks. The current study did not replicate that evidence. However, if it is true as suggested earlier, that there was not a simple-complex manipulation, but rather a intermediate-complex manipulation, not replicating the evidence of Earley (1985) and Wood et al (1987) would not be surprising.

Another interesting tie between the current findings and the literature has to do with the locus of control variable. We see no connection between locus of control and any of the outcome measures. The locus of control literature reviewed (Lefcourt, 1991; Noe, 1986; Rotter, 1966) suggested that individuals identified as having an internal locus of control would perform better than individuals identified as having an external locus of control. However, those results were not found in the current study.

Strengths and Weaknesses of Current Study

I feel it is important to highlight the strengths and weaknesses of the study at this point, which in turn will point out the implications for both science and practice, and indicate areas for future research.

One strength is that it is the first study to investigate both types of transfer of training techniques (goal setting and relapse prevention) and include a control condition, as well as manipulate task complexity. As such, the design of the study can be used as a

model for future researchers interested in investigating differences between transfer of training methods. However, in using this design, future researcher must also take into account what could be a possible weakness. This study attempted to have a simple and complex task. As discussed, the study may have employed a intermediate-complex task manipulation. Future researchers must pay particular attention to the task manipulation.

A second strength of the study is that results are consistent with previous research indicating transfer of training methods do help increase an individual's self-efficacy. This has very direct implications for the practice side of our field. Although not found in the current study, past research has shown that increased self-efficacy is associated with increased performance. Therefore, trainers should actively look to increase a trainee's self-efficacy toward the task, and transfer of training methods are very likely way to do that.

Finally, the study helped to address a need highlighted by Burke (1997) and Latham and Seijts (1997); that being a need to do rigorous empirical investigation on relapse prevention transfer of training. Both have indicated that relapse prevention has not been studied in a systematic way, and that very few studies have actually been conducted concerning relapse prevention in the Industrial/Organizational literature. Even though the results of this study can be described as inconclusive, at best, the study still addressed a pressing need identified by the science side of our field. Generally, it can be asked of training researchers to incorporate and investigate relapse prevention methods in future research.

The first limitation of the current study that should be discussed concerns the ambiguity of the complexity manipulation. As discussed, we do see differences on the

dependent measures between the tasks. However, the manipulation check employed indicates that participants did not see a significant complexity difference between the two tasks. The limitation these conflicting findings impose is that it cannot be confidently determined that the differences we see between the two tasks are due to differences is complexity. It may be some underlying, non-measured attribute of the tasks that is driving the differences.

A second limitation to highlight concerns the training manipulation measure, which asked about obstacles that could prevent successful completion of the task. It was found that there were no differences in the number of possible obstacles indicated between the control, goal setting, and relapse prevention groups. While this raises the concern of the adequacy of the training manipulation, it is more likely the case that the question itself is a poor manipulation check for training method. It was expected that participants in the relapse prevention groups would indicated more possible obstacles to success that individuals in the other two training groups, which was not found. Yet, participants in relapse prevention training are taught and discuss coping mechanisms for overcoming those obstacles. Therefore at the end of training it would be logical that participants in the relapse prevention training groups may not indicate more possible obstacles to success. For future research, a different type of manipulation check should be investigated.

Finally the power of the statistical tests should be addressed. Similar to many research studies, a larger sample more than likely would have uncovered more experimental differences. This is especially true at the interaction level, where the power

to detect a small effect was quite small. It is very likely that with a much larger sample size, the results and ensuing discussion would be very different.

Implications for Future Research and Practice

While I have briefly mentioned possible areas of future research, it is important to go into more detail on a couple of the suggestions, and to give other suggestions not already mentioned. In future research, a much simpler task than the one presented in this study should be used. As mentioned, it may be the case that the simple task had more an intermediate complexity. Therefore, future research that may try to replicate the current study should employ a simpler task. Researchers could still use the complex web page as the complex task, but have the simple task be a non-technology type of task, such as a simple construction task.

It seems very straightforward that future research should attempt to find out if relapse prevention training does decrease self-efficacy in some tasks, and if in some situations it only temporarily decreases self-efficacy, while increasing it in the long term. Such research would need to employ a longitudinal design of a much longer time period than used in the current study. Further, research should also try to replicate if relapse prevention training does decrease self-efficacy in some situations.

Self-efficacy was not associated with later performance in this study. This is contrary to almost all prior research on the self-efficacy and performance link. One suggestion already given is for future researchers to look at the different components or facets of self-efficacy and their relationship to performance. Another suggestion given here is for future research to look at if the self-efficacy-performance link may be different when asking individuals to demonstrate skills on very new technologies.

With the ever increasing and expansion of technology, it will be important for industrial and organizational psychologists to see if long-standing proven methods

(e.g., goal setting) are equally effective with cutting edge skill requirements of the new millennia. What this means for the science side of our field is that researchers will need to stay abreast of the latest technologies, and figure out how to incorporate those technologies into scientific explorations. To do this, researchers will need to partner with individuals who are mostly on the practice side of the field, and with individuals outside of psychology. In turn, individuals who are mostly on the practice side of our field will need to identify what the newest technologies being used in the world of work are, and feed those back to the researchers to incorporate into research. Only then will we as a field be able to fully understand if both proven and new methods are appropriate for what we both face in the 21st century.

REFERENCES

Alliger, G. M., & Janak, E. A. (1989). Kirkpatrick's levels of training criteria: Thirty years later. Personnel Psychology, 42, 331-342.

Anderson, J. R. (1982). Acquisition of a cognitive skill. Psychological Review, 89, 369-406.

Anderson, J., & Wexley, K. N. (1983). Applications-based management development: A method to promote practical application of managerial and supervisory training. Personnel Administrator, 28, 39-43.

Annis, H. M., & Davis, C. S. (1989). Relapse prevention training: A cognitive-behavioral approach based on self-efficacy theory. Special Issue: Relapse: Conceptual, research and clinical perspectives. Journal of Chemical Dependency Treatment, 2, 81-103.

Anthony, P., & Norton, L. A. (1991). Link HR to corporate strategy. Personnel Journal, 7, 75-86.

Argote, L., Insko, C. A., Yovetich, N., & Romero, A. A. (1995). Group learning curves: The effects of turnover and task complexity on group performance. Journal of Applied Social Psychology, 25, 512-529.

Baldwin, T. T., & Ford, J. K. (1988). Transfer of training: A review and directions for future research. Personnel Psychology, 41, 63-106.

Bandura, A. (1977). Social learning theory. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall.

Barling, J., & Beattie, R. (1983). Self-efficacy beliefs and sales performance. Journal of Personality and Social Psychology, 45, 464-469.

Biggs, J. B., & Rihn, B. (1984). The effects of interventions on deep and surface approaches to learning. In J. R. Kirby (Ed.), Cognitive strategies and educational performance (pp. 279-293). San Diego, CA: Academic Press.

Bjork, R. A. (1994). Institutional impediments to effective training. In D. Druckman & R. A. Bjork (Eds.), Learning, remembering, believing: Enhancing human performance. Washington DC: National Academy Press.

Burke, L. A. (1997). Improving positive transfer: A test of relapse prevention training on training outcomes. Human Resources Development Quarterly, 8, 115-128.

Campbell, J. P., Dunnette, M. D., Lawler, E. E., & Weick, K. E., Jr. (1970). Managerial behavior, performance and effectiveness. New York: McGraw-Hill.

Cascio, W. F. (1991). Applied psychology in personnel management (4th ed.). Englewood Cliffs, NJ: Prentice Hall.

Clement, R. W. (1982). Testing the hierarchy theory of training evaluation: An expanded role for trainee reactions. Public Personnel Management, 11, 176-184.

Cohen, J. (1977). Statistical power analysis for the behavioral sciences. New York: Academic Press.

Cook, T. D., & Campbell, D. T. (1979). Quasi-experimentation: Design and analysis issues for field settings. Boston: Houghton Mifflin.

Decker, P. J. (1980). Effects of symbolic coding and rehearsal in behavior-modeling training. Journal of Applied Psychology, 65, 627-634.

Dixon, N. M. (1987). Meet training's goals without reaction forms. Personnel Journal, 66, 108-115.

Dossett, D. L., Latham, G. P., & Mitchell, T. R. (1979). The effects of assigned versus participatively set goals, KR, and individual differences when goal difficulty is held constant. Journal of Applied Psychology, 64, 291-298.

Dweck, C. S. (1986). Mental processes affecting learning. American Psychologist, 41, 1040-1048.

Dweck, C. S. & Elliot, E. S. (1983). Achievement motivation. In E. M. Hetherington (Ed.), Handbook of child psychology (Vol. 4, pp. 643-691). New York: Wiley.

Earley, P. C. (1985). Influence of information, choice, and task complexity upon goal acceptance, performance, and personal goals. Journal of Applied Psychology, 70, 481-491.

Earley, P. C., Connolly, T., & Ekegren, G. (1989). Goals, strategy development, and task performance: Some limits on the efficacy of goal setting. Journal of Applied Psychology, 74, 24-33.

Ehigie, B. O. (1994). Strategies of target setting and performance feedback for simple and complex tasks. Ife Psychologia: An International Journal, 2, 29-40.

Erez, M., & Zidon, I. (1984). Effect of goal acceptance on the relationship of goal difficulty to performance. Journal of Applied Psychology, 69, 69-78.

Feldman, D. C. (1984). The development and enforcement of group norms. Academy of Management Review, 9, 47-53.

Feltz, D. L., & Doyle, L. A. (1981). Improving self-confidence in athletic performance. Motor Skills: Theory into Practice, 5(2), 112-122.

Feltz, D. L., & Weiss, M. (1982). Developing self-efficacy through sports. Journal of Physical Education, Recreation, and Dance, 53(2), 24-26, 36.

Ford, J. K., Quiñones, M. A., Sego, D. J., & Speer-Sorra, J. (1992). Factors affecting the opportunity to perform trained tasks on the job. Personnel Psychology, 45, 511-527.

Gagne, R. M. (1977). The conditions of learning. New York: Holt, Rinehart, & Winston.

Gagne, R. M. (1984). Learning outcomes and their effects: Useful categories of human performance. American Psychologists, 39, 377-385.

Gagne, R. M. (1986). Research on learning and retaining skills. In I. L. Goldstein, R. M. Gagne, R. Glaser, J. M. Royer, T. J. Shuell, & D. L. Payne (Eds.), Learning research laboratory; proposed research issues (AFHRL-TP-85-54, pp. 5-19). Brooks Air Force Base, TX: Manpower and Personnel Division, Air Force Human Resources Laboratory.

Georgenson, D. L. (1982). The problem of transfer calls for partnership. Training and Development Journal, 36, 75-78.

Ghodsian, D., Bjork, R. A., & Benjamin, A. S. (1997). Evaluating training during training: Obstacles and opportunities. In M. A. Quiñones & A. Ehrenstein (Eds.), Training for a rapidly changing workplace: Applications of psychological research (pp. 63-88). Washington, D.C.: American Psychological Association.

Gist, M. E. (1997). Training design and pedagogy: Implications for skill acquisition, maintenance, and generalization. In M. A. Quiñones & A. Ehrenstein (Eds.), Training for a rapidly changing workplace: Applications of psychological research (pp. 201-223). Washington, D.C.: American Psychological Association.

Gist, M. E., & Mitchell, T. R. (1992). Self-efficacy: A theoretical analysis of its determinants and malleability. Academy of Management Review, 17, 183-211.

Gist, M. E., Bavetta, A. G., & Stevens, C. K. (1990). Transfer training method: Its influence on skill generalization, skill repetition, and performance level. Personnel Psychology, 43, 501-523.

Glaser, R. (1986). Training expert apprentices. In I. L. Goldstein, R. M. Gagne, R. Glaser, J. M. Royer, T. J. Shuell, & D. L. Payne (Eds.), Learning research laboratory: Proposed research issues (AFHRL-TP-85-54, pp. 20-28). Brooks Air Force Base, TX: Manpower and Personnel Division, Air Force Human Resources Laboratory.

Goldstein, I. L. (1980). Training in work organizations. Annual Review of Psychology, 31, 229-272.

Goldstein, I. L. (1986). Training in organizations: Needs assessment, development, and evaluation (3rd ed.). Pacific Grove, CA: Brooks/Cole.

Gregorich, S. E., Helmreich, R. L. & Wilhelm, J. A. (1990). The structure of cockpit management attitudes. Journal of Applied Psychology, 75, 682-690.

Hesketh, B. (1997). Dilemmas in training for transfer and retention. Applied Psychology: an International Review, 46, 350-365.

Hollenbeck, J. R., Williams, C. R., & Klein, H. J. (1989). An empirical examination of the antecedents of commitment to difficult goals. Journal of Applied Psychology, 74, 18-23.

Holmbeck, G. N. (1997). Toward terminological, conceptual, and statistical clarity in the study of mediators and moderators: Examples from the child-clinical and pediatric psychology literatures. Journal of Consulting and Clinical Psychology, 65, 599-610.

Kernan, M. C., Bruning, N. S., & Miller-Guhde, L. (1994). Individual and group performance: Effects of task complexity and information. Human Performance, 7, 273-289.

Kirkpatrick, D. L. (1976). Evaluation of training. In R. L. Craig (Ed.), Training and development handbook: A guide to human resource development. New York: McGraw-Hill.

Kirkpatrick, D. L. (1987). Evaluation of training. In R. L. Craig (Ed.), Training and development handbook: A guide to human resource development (3rd ed., pp. 301-319). New York: McGraw-Hill.

Korsgaard, M. A., & Diddams, M. (1996). The effect of process feedback and task complexity on personal goals, information searching, and performance improvement. Journal of Applied Social Psychology, 26, 1889-1911.

Kraiger, K., & Jung, K. M. (1997). Linking training objectives to evaluation criteria. In M. A. Quiñones & A. Ehrenstein (Eds.), Training for a rapidly changing workplace: Applications of psychological research (pp. 151-175). Washington, DC: American Psychological Association.

Kraiger, K., Ford, J. K., & Salas, E. (1993). Application of cognitive, skill-based, and affective theories of learning outcomes to new methods of training evaluation. Journal of Applied Psychology, 78, 311-328.

Latham, G. P., & Frayne, C. A. (1989). Self-management training for increasing job attendance: A follow-up and a replication. Journal of Applied Psychology, 74, 411-416.

Latham, G. P., & Marshall, H. A. (1982). The effects of self-set, participatively set, and assigned goals on the performance of government employees. Personnel Psychology, 35, 399-404.

Latham, G. P, & Seijts, G. H. (1997). Overcoming mental models that limit research on transfer of training in organisational settings. Applied Psychology: An International Review. 46, 371-375.

Lefcourt, H. M. (1991). Locus of control. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.) Measures of social psychological attitudes, vol. 1. (Pp. 413-499). San Diego, CA: Academic Press, Inc.

Locke, E. A. (1968). Toward a theory of task motivation and incentives. Organizational Behavior and Human Performance, 3, 157-189.

Locke, E. A. (1996). Motivation through conscious goal setting. Applied and Preventive Psychology, 5, 117-124.

Locke, E. A., & Latham, G. P. (1984). Goal setting: A motivational tool that works! Englewood Cliffs, NJ: Prentice-Hall.

Locke, E. A., & Latham, G. P. (1990a). Work motivation and satisfaction: Light at the end of the tunnel. Psychological Science, 1, 240-246.

Locke, E. A., & Latham, G. P. (1990b). Work motivation: The high performance cycle. In U. Kleinbeck, H. H. Quast, H. Thierry, & H. Häcker (Eds.), Work Motivation (pp. 3-25). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Locke, E. A., Latham, G. P., & Erez, M. (1988). The determinants of goal commitment. Academy of Management Review, 13, 23-39.

Locke, E. A., Frederick, E., Lee, C., & Bobko, P. (1984). Effect of self-efficacy, goals, and task strategies on task performance. Journal of Applied Psychology, 69, 241-251.

Locke, E. A., Shaw, K. N., Saari, L. M., & Latham, G. P. (1981). Goal setting and task performance: 1969-1980. Psychological Bulletin, 90, 125-152.

Luthans, F., & Davis, T. R. V. (1979). Behavioral self-management - the missing link in managerial effectiveness. Organizational Dynamics, 8, 42-69.

Marlatt, G. A., & Gordon, J. R. (1980). Determinants of relapse: Implications for the maintenance of behavior change. In P. O. Davidson & S. M. Davidson (Eds.), Behavior medicine: Changing health life styles (pp. 410-452). New York: Brunner/Mazel.

Marx, R. D. (1982). Relapse prevention for managerial training: A model for maintenance of behavior change. Academy of Management Review, 7, 433-441.

Marx, R. D. (1985). Relapse prevention for managerial training: A model for maintenance of behavior change. Academy of Management Review, 7, 433-441.

Marx, R. D., & Karren, R. J. (1988). The effects of relapse prevention training and interactive follow-up on positive transfer of training. Paper presented at annual Academy of Management, Anaheim, CA.

Mathews, L. M., Mitchell, T. R., George-Falvy, J., & Wood, R. E. (1994). Goal selection in a simulated managerial environment. Group & Organization Management, 19, 425-449.

McKenna, J. F. (1990). Take the 'A' training. Industry Week, 239, 22-29.

Miller, T. W., Carmona, J. J., & Leukefeld, C. (1993). Prevention education and substance abuse treatment. Journal of Contemporary Psychotherapy, 23, 193-205.

Muchinsky, P. M. (1993). Psychology applied to work (4th ed.). Pacific Grove, CA: Brooks/Cole Publishing.

Newstrom, J. W. (1986). Leveraging management development through the management of transfer. Journal of Management Development, 5, 33-45.

Noe, R. A. (1986). Trainees' attributes and attitudes: Neglected influences on training effectiveness. Academy of Management Review, 11, 736-749.

Noe, R. A., & Ford, J. K. (1992). Emerging issues and new directions for training research. Research in Personnel and Human Resources Management, 10, 345-384.

Noe, R. A., Sears, J., & Fullenkamp, A. M. (1990). Relapse training: Does it influence trainees' post training behavior and cognitive strategies? Journal of Business & Psychology, 4, 317-328.

Premack, D. (1959). Toward empirical behavior laws: I. Positive reinforcement. Psychological Review, 66, 219-233.

Puffer, S. M., & Brakefield, J. T. (1989). The role of task complexity as a moderator of the stress and coping process. Human Relations, 42, 199-217.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 80, (1, Whole No. 609).

Shiffrin, R. M., & Dumais, S. T. (1981). The development of automatism. In J. R. Anderson (Ed.), Cognitive skills and their acquisition (pp. 111-140). Hillsdale, NJ: Erlbaum.

Stumpf, S. A., Brief, A. P., & Hartman, K. (1987). Self-efficacy expectations and coping with career-related events. Journal of Vocational Behavior, 31, 91-108.

Tziner, A., Haccoun, R. R., & Kadish, A. (1991). Personal and situational characteristics influencing the effectiveness of transfer of training improvement strategies. Journal of Occupational Psychology, 64, 167-177.

Wexley, K. N., & Baldwin, T. T. (1986). Posttraining strategies for facilitating positive transfer: An empirical exploration. Academy of Management Journal, 29, 503-520.

Wideman, H. H., & Owston, R. D. (1993). Knowledge base construction as a pedagogical activity. Journal of Educational Computing Research, 9, 165-196

Wood, R. E. (1986). Task complexity: Definition of the construct. Organizational Behavior and Human Decision Processes, 37, 60-82.

Wood, R. E., Mento, A. J., & Locke, E. A. (1987). Task complexity as a moderator of goal effects: A meta-analysis. Journal of Applied Psychology, 72, 416-425.

Xiao, Y., Hunter, W. A., Mackenzie, C. F., Jefferies, N. J., Horst, R. L., & LOTAS Group. (1996). Task complexity in emergency medical care and its implications for team coordination. Human Factors, 38, 636-645.

Table 1

Total Participants per Cell, and Total Participants Completing a Web Page.

Task Type	Control	Goal Setting	Relapse Prevention	Total Number of Participants
Simple	N of Cell: 25	N of Cell: 24	N of Cell: 26	75
	N Completed: 20	N Completed: 19	N Completed: 23	62
Complex	N of Cell: 27	N of Cell: 27	N of Cell: 25	79
	N Completed: 16	N Completed: 15	N Completed: 16	47
Total Participating	52	51	51	154
Total Completing	36	34	39	109

Note. Row and column totals are used to compute power levels in Table 2

Table 2

Main Effect and Interaction Power Levels by Effect Size

		r		
	N of Smallest Cell	Small (r = .10)	Medium (r = .30)	Large (r = .50)
Main Effects				
Training Method—All Trainees	51	.18	.70	.98
Training Method—Completed Web Pages	34	.15	.54	.93
Task—All Trainees	75	.22	.85	.99+
Task—Completed Web Pages	47	.18	.67	.98
Interaction				
Method X Task, those trained	24	.14	.42	.83
Method X Task, completed web page	15	.12	.30	.63

Note. Assumes 2-tailed significance test at alpha = .10

Table 3

Results of Computer and Internet Experience Questions

Own or Use Computer		98.1 % Yes	1.9 % No
		N	%
Type of Computer	Apple-Mac	10	6.5%
	IBM-PC	106	68.8%
	Other	20	13.3%
	Don't Know	14	9.1%
	Missing	4	2.5%
		Mean	S. D.
Computer Use Per Week		4.40	.93
Internet Use Per Week		3.69	1.28
Computer Expertise		2.71	.94
Ever Constructed a Web Page		8.4 % Yes	90.3 % No
		N	%
Preferred Learning Method	Lecture	17	11%
	Video	4	2.6%
	Written Instructions	35	22.7%
	One on One Instructions	66	42.9%
	Practice on Own	27	17.5%
	Missing	5	3.2%

Table 4

Pre and Post Self-Efficacy Scores by Method and by Task

Method	Task	Pre Self-Efficacy	Post Self-Efficacy	Sig. Level of Paired T-Test (N)
Control	Simple	347.2	352.6	.802 (25)
	Complex	305.4	341.1	.106 (27)
	Total	325.5	346.6	.167 (52)
Goal Setting	Simple	335.3	371.7	.042 (24)
	Complex	349.2	392.2	.004 (27)
	Total	342.7	382.5	.000 (51)
Relapse Pre.	Simple	317.3	377.1	.000 (26)
	Complex	376.9	350.4	.283 (25)
	Total	346.5	364.0	.244 (51)
Overall	Simple	333.0	367.2	.001 (75)
Overall	Complex	343.0	361.5	.123 (79)
Overall	Total	338.1	364.3	.001 (154)

Table 5

Zero-order Correlations for Dependent Measures and Covariates

	Mean	S.D.	GPA	Computer Use	Internet Use	Computer Expertise	Locus of Control	Pre Self-Efficacy	Post Self-Efficacy	Speed	Qual
GPA	3.26	.47									
Computer Use	4.40	.93	.23*								
Internet Use	3.69	1.28	.14	.69***							
Computer Expertise	2.71	.94	-.11	.23**	.41***						
Locus of Control	10.23	3.70	.02	.03	-.07	-.16*					
Pre Self-Efficacy	338.15	91.96	.06	.16*	.27**	.42***	-.18*				
Post Self-Efficacy	364.29	103.68	-.05	.05	.31***	.41***	-.12	.51***			
Speed	10.03	6.24	-.04	-.10	-.01	.05	.12	.10	.10		
Quality	79.50	22.60	.06	.11	.08	-.07	-.01	-.02	-.01	-.15	

* $p \leq .05$

** $p \leq .005$

*** $p \leq .000$

Table 6

Analysis of Variance for Type of Computer Participant Uses and Preferred Learning Method on Speed and Quality

Source	df	Sum of Squares	Mean Squares	F Ratio
	Dependent	Variable = Speed		
Type of Computer	3	49.40	16.47	.410
Preferred Learning Method	4	100.62	25.16	.498
Within Groups	98	3934.32	40.16	
	Dependent	Variable=Quality		
Type of Computer	3	1122.15	374.05	.709
Preferred Learning Method	4	1036.50	259.12	.491
Within Groups	98	51670.38	527.25	

Note. F Ratio not significant.

Table 7

Analysis of Variance for Training Method

Source	df	Sum of Squares	Mean Squares	F Ratio
	Dependent	Variable = Speed		
Covariates				
Computer Use	1	70.41	70.41	1.78
Internet Use	1	15.48	15.48	0.39
Expertise	1	8.43	8.43	0.21
Obstacles	1	0.95	0.95	0.02
Predictor				
Training Method	2	60.21	30.11	0.76
Residual	101	3985.52	39.46	
	Dependent	Variable=Quality		
Covariates				
Computer Use	1	296.57	296.57	0.56
Internet Use	1	174.34	174.34	0.33
Expertise	1	733.35	733.35	1.39
Obstacles	1	79.40	79.40	0.15
Predictor				
Training Method	2	139.14	69.57	0.13
Residual	101	53454.57	529.25	

Note. F Ratio not significant.

Table 8

Means and Standard Deviations of Training Method on Speed and Quality

Group	N	Mean	S. D.	95% C.I.
	Dependent	Variable = Speed		
Control	36	10.75	1.06	8.59 to 12.91
Goal Setting	34	10.21	1.16	7.85 to 12.57
Relapse Prevention	39	9.21	0.91	7.36 to 11.05
	Dependent	Variable=Quality		
Control	36	78.11	24.17	69.93 to 86.29
Goal Setting	34	79.74	17.30	73.70 to 85.77
Relapse Prevention	39	80.67	25.51	72.40 to 88.94

Note. F Ratio not significant

Table 9

ANCOVA for Training Method on Self-Efficacy

Dependent Variable = Post – Training Self-Efficacy

Source	df	Sum of Squares	Mean Square	F Ratio
Covariate				
Pre-Training Self-Efficacy	1	405602.51	405602.51	50.45*
Predictor				
Method	2	19532.36	9766.18	1.22
Residual	150	1205991.16	8039.94	

* p = .000

Table 10

Summary of Hierarchical Regression Analyses for Increases in Self-Efficacy Predicting Task Performance

Variable	B	SE B	ß
	Dependent	Variable = Speed	
Step 1			
Pre-Training Self-Efficacy	.0068	.0066	.099
Step 2			
Pre-Training Self-Efficacy	.0045	.0084	.0657
Post-Training Self-Efficacy	.0035	.0081	.0545
	Dependent	Variable = Quality	
Step 1			
Pre-Training Self-Efficacy	-.0058	.024	-.0237
Step 2			
Pre-Training Self-Efficacy	-.0072	.0307	-.0292
Post-Training Self-Efficacy	.0021	.0294	.0088

Note for Speed Analysis. $R^2 = .009$ for step 1; $\Delta R^2 = .001$ for step 2. All steps are non-significant.

Note for Quality Analysis. $R^2 = .000$ for step 1; $\Delta R^2 = .000$ for step 2. All steps are non-significant.

Table 11

ANCOVA Table of Task Complexity and Training Method on the Speed Performance Dimension.

Source	df	Sum of Squares	Mean Squares	F Ratio
Covariates				
Computer Use	1	56.75	56.75	1.43
Internet Use	1	5.81	5.81	0.14
Expertise	1	11.54	11.54	0.29
Obstacles	1	0.16	0.16	0.00
Main Effects				
Training Method	2	46.44	26.77	0.58
Task Complexity	1	34.08	34.08	0.85
Interactions				
Method X Task	2	58.65	29.32	0.74
Residual	98	3888.06	39.67	

Table 12

ANCOVA Table of Task Complexity and Training Method on the Quality Performance Dimension.

Source	df	Sum of Squares	Mean Squares	F Ratio
Covariates				
Computer Use	1	205.71	205.71	0.41
Internet Use	1	562.59	562.59	1.14
Expertise	1	1030.88	1030.88	2.09
Obstacles	1	330.12	330.12	0.67
Main Effects				
Training Method	2	113.67	56.84	0.11
Task Complexity	1	4110.03	4110.03	8.35*
Interactions				
Method X Task	2	1077.62	538.81	1.09
Residual	98	48239.03	492.23	

* $p = .005$

Table 13

ANCOVA for Task Complexity and Training Method on Self-Efficacy Scores.

Dependent Variable = Post-Training Self-Efficacy

Source	df	Sum of Squares	Mean Square	F Ratio
Covariate				
Pre-Training Self-Efficacy	1	441675.64	441675.64	56.27*
Main Effects				
Method	2	18868.63	9434.31	1.20
Task	1	5754.77	5754.77	0.73
Interaction				
Method X Task	2	46972.67	23486.33	2.99**
Residual	147	1153739.68	7848.57	

* $p = .000$

** $p < .10$

Table 14

Difference Between Pre-Training and Post-Training Self-Efficacy Scores by Cell

	Control	**Goal Setting**	**Relapse Prevention**
Simple Task	5.40 (106.32)	36.33 (82.67)	59.81 (69.32)
Complex Task	35.74 (110.91)	42.96 (69.84)	-26.48 (120.47)

Note: Standard Deviation scores are indicated in parentheses.

Table 15

Summary of Regression Analyses of Training Method and Locus of Control on Speed Performance Measure

Variable	B	SE B	ß
Step 1			
Computer Use	-1.25	0.95	-0.16
Internet Use	0.45	0.67	0.08
Expertise	0.37	0.70	0.05
Obstacles	-0.09	0.34	-0.02
(Constant)	13.13	3.53	
Step 2			
Computer Use	-1.18	0.97	-0.15
Internet Use	0.39	0.67	0.07
Expertise	0.21	0.72	0.03
Obstacles	-0.02	0.35	-0.01
Training Method	-1.19	2.20	-0.16
Locus of Control	-0.15	0.17	-0.08
Method X Locus of Control	0.02	0.21	0.04
(Constant)	15.00	3.92	

Note. $R^2 = .019$ for step 1; $\Delta R^2 = .020$ for step 2; All steps are non-significant

Table 16

Summary of Regression Analyses of Training Method and Locus of Control on Quality Performance Measure

Variable	B	SE B	ß
Step 1			
Computer Use	2.59	3.48	0.09
Internet Use	1.37	2.45	0.07
Expertise	-3.16	2.56	-0.13
Obstacles	0.54	1.25	0.04
(Constant)	70.34	12.86	
Step 2			
Computer Use	3.15	3.56	0.11
Internet Use	1.26	2.48	0.06
Expertise	-3.45	2.62	-0.14
Obstacles	0.60	1.27	0.04
Training Method	3.41	8.05	0.12
Locus of Control	-0.67	0.65	-0.10
Method X Locus of Control	-0.20	0.76	-0.07
(Constant)	75.72	14.33	

Note. $R^2 = .027$ for step 1; $\Delta R^2 = .012$ for step 2; All steps are non-significant

Figure 1. Hypothesized model of current study.

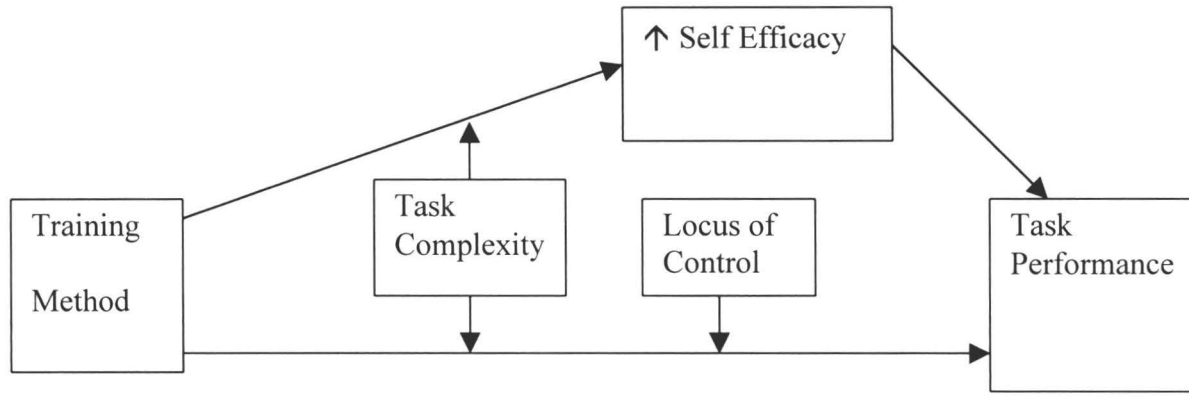


Figure 2. Kraiger, Ford, and Salas' (1993) preliminary classification scheme of learning outcomes.

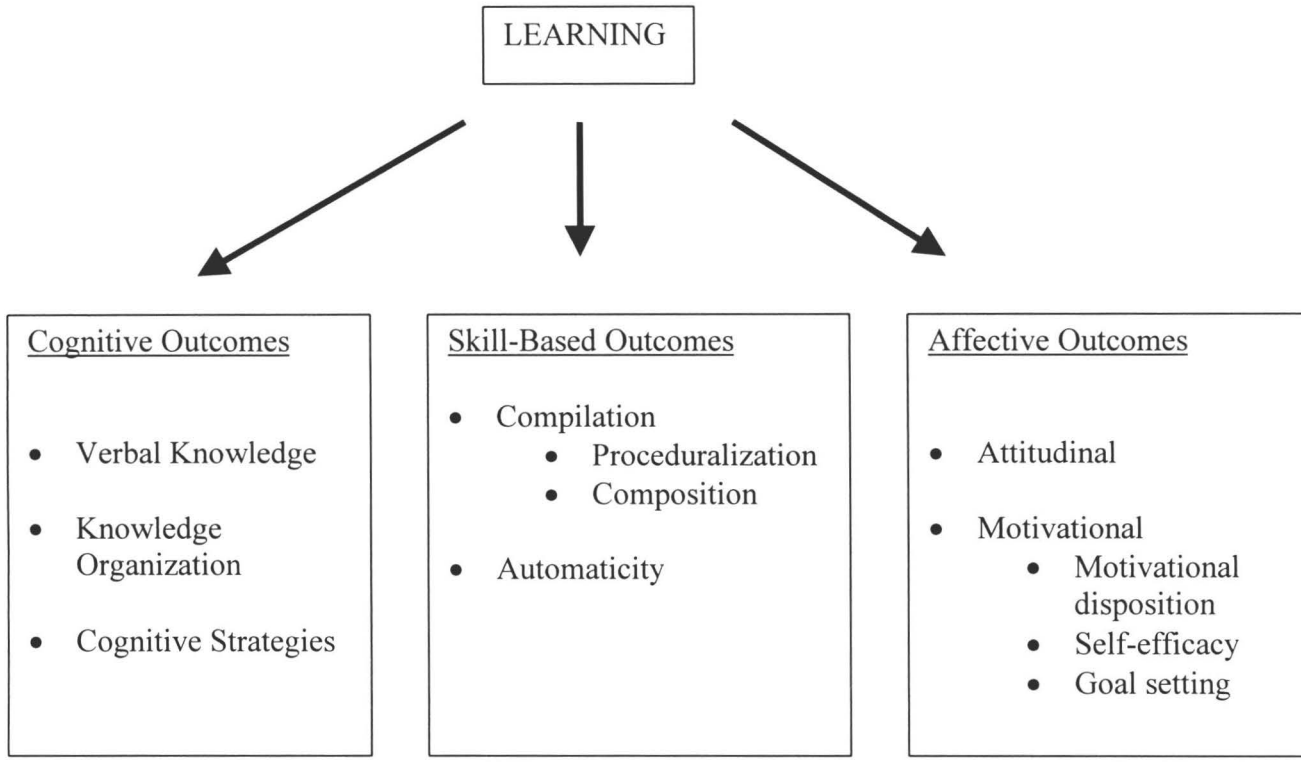


Figure 3. Hypothesized interaction between training method and task complexity.

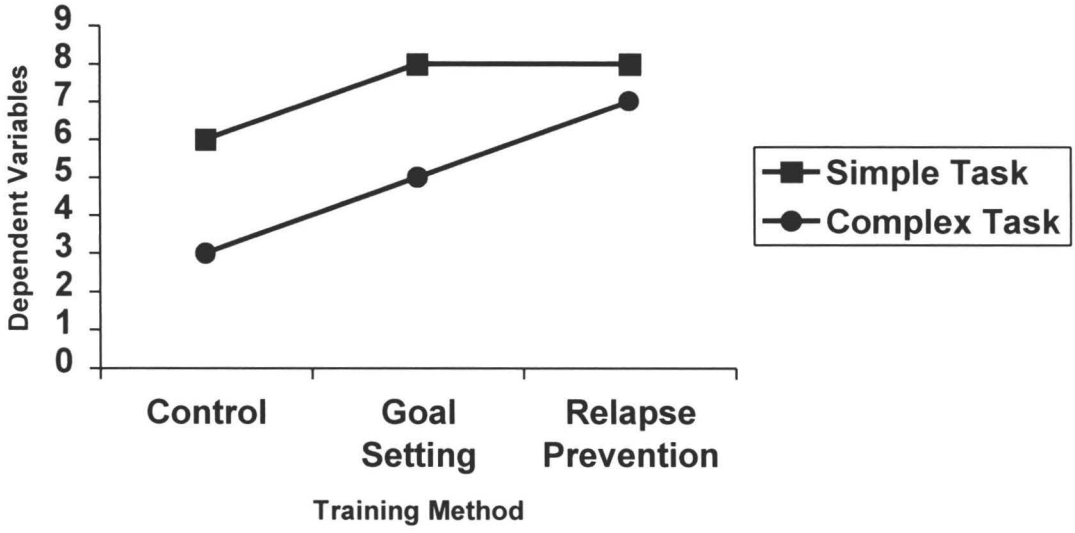
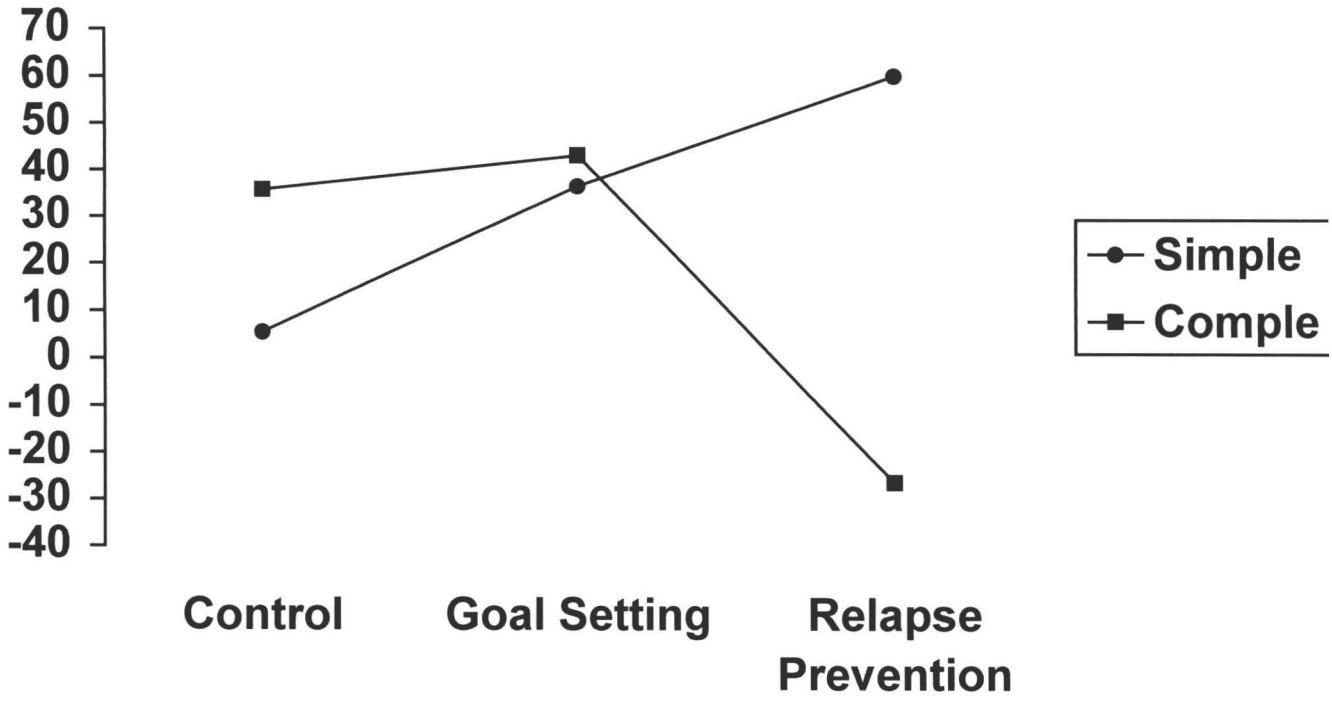


Figure 4. Self-Efficacy Difference Scores by Task Complexity and Training Method



Appendix A

Goal setting and relapse prevention scripts

Goal Setting Script

1. Define what goals are.
   - Goals are an end result, such as studying 10 hours per week, getting an 'A' in a class, etc…
   - They are a result for which a person strives for, or a desired outcome.

2. Describe the difference between effective versus ineffective goals.
   - Effective goals have the following characteristics: They are challenging yet attainable. It will take a high level of effort to reach the goal. Effective goals are specific. You know exactly number what you need to complete. Finally, effective goals are acceptable to the person who is given the goal.

   - Ineffective goals are the exact opposite. They tend to very easy or impossible, or they are very vague. "Do your best" goals are very ineffective. A person does not know how much, or what needs to be accomplished in what amount of time. Finally, ineffective goals are goals that are not accepted by the person. For example, if you were given a goal to score 100 on every test or paper for the rest of your college career, that goal would be impossible, and also unlikely to be accepted by you. You would then not try and reach that goal.

3. Explain why goals are effective
   - Goals are effective because they motivate a person's actions in a few different ways. First, goals direct a person's attention toward a goal-relevant activity, and away from non-relevant tasks. They serve as a reminder as to what you need to get done. Second, goals help maintain the intensity of effort an individual expends on the task. In other words, the individual works hard while at the goal-relevant activity. Finally, goals make people persist on the task until the goal is reached. A person knows they have to work on a task until a certain endpoint.

4. Give goals
   - Now that we have discussed what effective goals are and why they are effective, we are now going to discuss a goal to shoot for over the next few weeks constructing your web page
   - You have been given 3 weeks to complete your web page, check it for errors, and then email or phone the researcher with the web page address. That is a rather easy goal. Now given that goals are to be difficult and specific, we are

going to suggest that you complete your assignment within 1 week. Of course, it is to have all the elements that were described in the training. What are your feelings about this goal? Is it too difficult or not difficult enough? Is it specific enough? **Allow for discussion.** If this is acceptable, then consider the 1 week as your goal.

Relapse Prevention Script

1. Present self-management training
   - I am now going to train you on self-management techniques, so that you can monitor your own progress on the task shown here today.
   - We are going to focus on desired outcomes and how to achieve those outcomes.

2. Description of previous self-management programs.
   - Self-management programs have been used for a variety of purposes, mostly in the counseling area. For example, self-management programs have been used in training people to overcome addictive behaviors.
   - For example, a goal: Stop smoking, and how to achieve that goal. Identifying situations where a person would want to smoke, developing plans to overcome those situations, what to do if you have a relapse (or have a cigarette), and how to self-monitor the implementations of your goals and self-reinforce accomplishments.
   - The first step is to define and set goals

3. Define what goals are.
   - Goals are an end result, such as studying 10 hours per week, getting an 'A' in a class, etc…
   - They are a result for which a person strives for, or a desired outcome.

4. Describe the difference between effective versus ineffective goals.
   - Effective goals have the following characteristics: They are challenging yet attainable. It will take a high level of effort to reach the goal. Effective goals are specific. You know exactly number what you need to complete. Finally, effective goals are acceptable to the person who is given the goal.

   - Ineffective goals are the exact opposite. They tend to very easy or impossible, or they are very vague. "Do your best" goals are very ineffective. A person does not know how much, or what needs to be accomplished in what amount of time. Finally, ineffective goals are goals that are not accepted by the person. For example, if you were given a goal to score 100 on every test or paper for the rest of your college career, that goal would be impossible, and also unlikely to be accepted by you. You would then not try and reach that goal.

5. Explain why goals are effective

- Goals are effective because they motivate a person's actions in a few different ways. First, goals direct a person's attention toward a goal-relevant activity, and away from non-relevant tasks. They serve as a reminder as to what you need to get done. Second, goals help maintain the intensity of effort an individual expends on the task. In other words, the individual works hard while at the goal-relevant activity. Finally, goals make people persist on the task until the goal is reached. A person knows they have to work on a task until a certain endpoint.

6. Give goals
   - Now that we have discussed what effective goals are and why they are effective, we are now going to discuss a goal to shoot for over the next few weeks constructing your web page
   - You have been given 3 weeks to complete your web page, check it for errors, and then email or phone the researcher with the web page address. That is a rather easy goal. Now given that goals are to be difficult and specific, we are going to suggest that you complete your assignment within 1 week. Of course, it is to have all the elements that were described in the training. What are your feelings about this goal? Is it too difficult or not difficult enough? Is it specific enough? **Allow for discussion.** If this is acceptable, then consider the 1 week as your goal.

7. Defining a slip and a relapse
   - In relapse prevention, there are things defined as "slips" and things defined as a "relapse." A slip is a warning signal that tells you that you are not attempting to use your new skill, and that the goals you have set are in jeopardy. A relapse means that you have seriously disengaged from trying to use your new skills.
   - You have been given a 3 weeks window to complete your web page, with a specific goal of completing it within 1 week. We suggest that a slip be considered as not completing your assignment within the week. Does this sound appropriate? **Allow for discussing.**
   - We now suggest that a relapse be considered as not completing your web page within 2 weeks. At that point, you would be under considerable time pressure to complete the web page in the time-window allotted. Does this sound appropriate? **Allow for discussion.**

8. Presenting relapse prevention strategies.
   - We just discussed what your goals are, what a slip might be, and what a relapse is. We are now going to briefly discuss ideas and strategies that if you keep in mind can help to prevent a relapse. After generally discussing these ideas and strategies, we will go over specific action plans to prevent slips and a complete relapse.

   1. Know about the relapse process

We have already discussed this somewhat. A complete relapse doesn't just happen, often a slip will happen that gives warning to a possible relapse. A slip isn't a failure, but a reminder of what it takes to complete your task.

2. Recognize that there is a difference between the training setting and an applied setting.
   The task may seem very easy to complete in here. You have immediate access to help from the instructor, the manual and computer are right in front of you. When you go to do this at home or in a lab, you will feel much more "alone." Remember that you will have resources to call upon though.
3. Create a support network.
   It often helps to have others support what you are doing. Tell your friends and family what you are going to try to accomplish, and to bug you until its finished. We will discuss this in a little more detail later.
4. Identifying high-risk situations.
   It is helpful to recall past situations where you have tried to use a new skill but obstacles have gotten in the way. Obstacles can be anything from time pressures to forgetting what you had to do. In just a minute we will present you with some possible obstacles and strategies for overcoming them. However, start thinking of some possible obstacles yourself, and possible ways to overcome them. We can discuss them in a minute.
5. Try to use your skill when you will succeed.
   What this means is set yourself up for success. Don't start doing this task if you only have 15 minutes, or whatever supporting material you are going to use is not with you. Start the task knowing your ready and have the time
6. Realize that seemingly unimportant behaviors can lead to errors.
   Often this can take the form of scheduling conflicts. Agreeing to go to a movie tomorrow while knowing that you have a paper due, an exam in a couple of days, and this task to complete will likely lead to a relapse. Try to consciously think about things you need to do in the next week or two before agreeing to other commitments.
7. Limit blame and emotional reaction.
   Often times people who break their commitment to implement a new skill may experience predictable emotional consequences. For example, people may start having a lot of self-blame or blaming the inadequacy of the training. If a slip occurs, realize that these are normal reactions. But then, pretend that you are once again at the very start. Make a time schedule of what you need to get done in the next few days and follow the time schedule diligently.
8. Maintain your self-confidence.
   As you go about constructing your web page, you will likely make some temporary errors or failures. When this happens, a person's self-confidence often is lowered. Try not to let that happen. Remember that trail and error is a normal process, but that you have the skill to eventually finish the task correctly.
9. Review your personal characteristics that can interfere with skill retention
   Think about if you consider yourself a perfectionist, unassertive, have a low tolerance for stress, or have a low motivation to complete the task. All of

these can prevent you from beginning or completing the task. Think introspectively about yourself and see if any of these are true for yourself. If so, realize it and try to understand that these ideas can often try to undermine your success.

10. Schedule in desirable activities.
    Intentionally schedule in activities that you want to do. The saying "All work and no play makes jack a dull boy" is very appropriate here. Give yourself pleasurable things to do along with your school work, regular work, and the assigned task.
11. Create your own rewards and or punishments.
    This is part of self-monitoring you own behavior. We will go into this in a little more depth in just a minute.

- Are there any questions or suggestions about these ideas and strategies before we move on.

9. Predicting obstacles that could cause a slip and ways to overcome those obstacles.

- We now need to identify some reasons why the "slip" would occur, or why you would not complete the task in the 1st week. We have though up some reasons and applicable coping strategies, and we will share them with you. As we go through these, think about other possible obstacles that might cause a slip, and coping strategies. And share them with the group if you would like.
- Here are some possible problem situations
  Problem 1. You don't have a computer, or have Windows 3.1.
  Solution: Use the Weber lab on campus. Open to all natural science majors

  Problem 2. Over the next few days, you forget what you have learned here.
  Solution: There are a variety ways to overcome this problem. First, if you took notes today, keep them handy when practicing your skills. Second, the handout/manual we have given today will serve as a reminder and guide of what needs to be done. Third, if you use the Weber building computer room, there are lab assistants there to help you with any questions. Ask them. Fourth, look in the help menu in Word. Search for 'web page' and that may give you the information needed.

  Problem 3. You may feel that you have no time to complete this task.
  Solution: What you should do if you feel this way is to make a schedule of class and work times, and identify empty time periods. If you are on campus during those periods, make a point of going to the Weber lab during those periods. Most people have a couple of hours on the weekend in which they can practice these computer skills.

  Problem 4. After a week you still haven't gotten started on constructing your web page.
  Solution: At that point, don't think that you have failed and give up. Once you have realized that you are late in getting started, pretend that that is your starting point. Take the goals we have discussed and set out time periods

from that point. Other things you can do to try and avoid this situation is to ask others to remind you. It may sound lame, but call your mom/dad/grandparent in the next day or two and ask them to remind you in a week about completing your web page. Ask a friend or roommate to do the same. Most people have a notebook for classes. Skip ahead 4 or 5 blank pages and write yourself a reminder on the top. Then, as you are taking notes, when you get to that page, it will remind you to practice the skills you have learned.

Problem 5. You have no motivation construct a personal web page.
Solution: If you do not know it by now, it is important to realize that the Internet is a growing part of the business world. If you are equally qualified as someone else applying for a job, but if you know how to navigate the Internet and construct your own web page, you will be more valuable for the company and more likely to be hired. Also, if you have distant family and they have Internet access, a personal web page is another way to stay in touch. For example, I know a person who works in Colorado but is from South America. He recently had a child, and he puts pictures of his child on his web page semi-daily so that his family in South America can have an instant view of their grandchild.

- Are there any other situations you can think of why you would not be able to construct you personal web page?

10. Self-monitoring progress
    - You need to be able to self-monitor your progress, in order to keep you on track toward your goals.
    - First, you should create a checklist of what you need to do to complete the web page, and check off the tasks as you complete them.
    - We already talked about having others, such as family members and friends/roommates, to remind you about practicing your skills. Even though it may not sound like "self-monitoring," it really is because *you* are asking them to help you monitor your progress.
    - Put a calendar in a prominent place (refrigerator, mirror, etc.) with target dates for completing certain tasks. So, for example you can run the script file tomorrow, create the page in Word in 2 days, and FTP and check the page in 4 days. Create your own time schedule, put that on a calendar and put the calendar in a prominent place
    - Does anyone else have any suggestions for how to self-monitor your progress?

11. Self-reinforcement methods
    - It is important to reinforce yourself for interim accomplishments. In other words, you should give yourself rewards while you learn and practice your skills, and not just wait until the end of all your goals and practicing to reward yourself.

- One thing you could do is after you have completed a couple of the steps is to tell a family member what you are doing. Parents and grandparents are always interested hearing what you are doing and tend to be proud of your accomplishments. Their praise can be your reward
- You can promise yourself not to see a movie you have wanted to see until you have finished a certain number of the tasks on your list.
- What is important here is to think of things that you would like to do or have, and not give them to yourself until you have accomplished a certain percentage of the tasks, or completed your goal.

Appendix B

Description of tasks and task complexity scales

Simple task. You are going to be trained how to develop a personal web page that you will put on the Internet. There are three main steps to constructing a web page, which I will briefly describe before showing you. First, you need to set up a web-hosting environment. This will entail running a script file on you lamar or holly account. Second, using Word for Windows, you will be putting together the parts of your web page. On your web page you will have a picture from clipart in Word, your resume or a 1 paragraph biographical sketch, and a background wallpaper. You will not need to link any elements within the page or create links to other Internet sites. Third, you will be shown how to publish your web page, which will involve FTP'ing your page to your lamar or holly account.

Complex task. You are going to be trained how to develop a personal web page that you will put on the Internet. There are three main steps to constructing a web page, which I will briefly describe before showing you. First, you need to set up a web-hosting environment. This will entail running a script file on you lamar or holly account. Second, using Word for Windows, you will be putting together the parts of your web page. On your web page, you will have 2 pictures from clipart in Word, your resume or a 1 paragraph biographical sketch, background wallpaper, a quote from a favorite book, magazine, or song, and a 3 sentence expansion from part of your resume or biographical sketch. Further, your 1st picture will be a link to the quote, the 2nd picture will be a link to the CSU homepage and one word from your resume or bio will be linked to the 3-

sentence expansion. Third, you will be shown how to publish your web page, which will involve FTP'ing your page to your Lamar or holly account.

Complexity scale. Participants will rate each statement on the following scale (1 = Do not agree, to 5 = Agree).

1. I believe that there are many components to this task.
2. I believe that a high degree of coordination among the parts of this task are needed.
3. I feel that there are a number of acts that must be performed.
4. I feel there are a lot of knowledge and skill requirements needed to complete this task.

Appendix C

DATE: _____ **LOGIN:** _____

WEB PAGE TRAINING

INSTRUCTIONS: Please answer all the questions on the first page. Do not turn the page until instructed by the research assistant.

SEX: MALE _____ FEMALE _____

AGE: _____

YEAR IN SCHOOL: FIRST _____

SECOND _____

THIRD _____

FOURTH _____

FIFTH OR MORE _____

MAJOR: _____ **GPA (overall):** _____

LOGIN: _____

INSTRUCTIONS: The following questions ask about your computer/Internet knowledge and experience. Please answer all the questions. Do not turn the page until instructed to do so by the research assistant.

1. Do you own or use a computer? **YES: _____** **NO: _____**

2. What type of computer do you most commonly use? (Check only one line)

___ Apple / Macintosh
___ IBM / PC
___ Other : _____
___ I don't know
___ I don't have and/or use a computer

3. How often per week do you use a computer for any reason? (Circle only one number)

1	2	3	4	5
Never		Somewhat often		Very often

4. How often per week are you on the Internet (i.e., surfing the web)? (Circle only one number)

1	2	3	4	5
Never		Somewhat often		Very often

5. Rate your level of computer expertise: (Circle only one number)

1	2	3	4	5
Novice				Expert

6. Have you ever constructed a personal web page before today?

____ Yes
____ No
____ Unsure

7. What is your preferred method of learning new material? (Mark only one line)

____ Lecture
____ Video
____ Written Instructions
____ One on One Instruction
____ Practice on Your Own

LOGIN: _____

INSTRUCTIONS: Below are 29 pairs of statements. For each pair, circle the letter of the statement that you agree with the most. For each pair, *try to choose one of the statements*. When you are done, *STOP!*. Do not continue on.

1. A. Children get into trouble because their parents punish them too much.
   B. The trouble with most children nowadays is that their parents are too easy with them.

2. A. Many of the unhappy things in people's lives are partly due to bad luck.
   B. People's misfortunes result from the mistakes they make.

3. A. One of the major reasons why we have wars is because people don't take enough interest in politics.
   B. There will always be wars, no matter how hard people try to prevent them.

4. A. In the long run people get the respect they deserve in this world.
   B. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. A. The idea that teacher are unfair to students is nonsense.
   B. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. A. Without the right breaks one cannot be an effective leader.
   B. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. A. No matter how hard you try some people just don't like you.
   B. People who can't get others to like them don't understand how to get along with others.

8. A. Heredity plays the major role in determining one's personality.
   B. It is one's experiences in life which determine what one is like.

9. A. I have often found that what is going to happen will happen.
   B. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. A. In the case of the well-prepared student there is rarely if ever such a thing as an unfair test.
    B. Many times exam questions tend to be so unrelated to course work that studying is really useless.

LOGIN: _____

11. A. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
B. Getting a good job depends mainly on being in the right place at the right time.

12. A. The average citizen can have an influence in government decisions.
B. This world is run by the few people in power, and there is not much the little guy can do about it.

13. A. When I make plans, I am almost certain that I can make them work.
B. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. A. There are certain people who are just no good.
B. There is some good in everybody.

15. A. In my case getting what I want has little or nothing to do with luck.
B. Many times we might just as well decide what to do by flipping a coin.

16. A. Who gets to be the boss often depends on who was lucky enough to be in the right place first.
B. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

17. A. As far as world affairs are concerned, most of us are the victims of forces we can neither understand nor control.
B. By taking an active part in political and social affairs, the people can control world events.

18. A. Most people don't realize the extent to which their lives are controlled by accidental happenings.
B. There really is no such thing as "luck".

19. A. One should always be willing to admit mistakes.
B. It is usually best to cover up one's mistakes.

20. A. It is hard to know whether or not a person really likes you.
B. How many friends you have depends on how nice a person you are.

21. A. In the long run the bad things that happen to us are balanced by the good ones.
B. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. A. With enough effort we can wipe out political corruption.
B. It is difficult for people to have much control over the things politicians do in office.

23. A. Sometimes I can't understand how teachers arrive at the grades they give.
B. There is a direct connection between how hard I study and the grades I get.

LOGIN: _____

24. A. A good leader expects people to decide for themselves what they should do.
B. A good leader makes it clear to everybody what their jobs are.

25. A. Many time I feel that I have little influence over the things that happen to me.
B. It is impossible for me to believe that chance or luck plays an important role in my life.

26. A. People are lonely because they don't try to be friendly.
B. There's not much use in trying too hard to please people, if they like you, they like you.

27. A. There is too much emphasis on athletics in high school.
B. Team sports are an excellent way to build character.

28. A. What happens to me is my own doing.
B. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. A. Most of the time I can't understand why politicians behave they way they do.
B. In the long run the people are responsible for bad government on a national as well as on a local level.

STOP!

LOGIN: _____

TASK: CONSTRUCTING A PERSONAL WEB PAGE

DESCRIPTION: You will be shown how to construct a personal web page. There will be a variety of topics covered and shown, including setting up a web hosting environment, creating the page and its contents on the computer, publishing the page, and viewing the home page on the Internet.

INSTRUCTIONS: First, please answer Yes or No to each question. Then, for each question you answered "YES", answer how confident you are in being able to match what the statement says, using the scale below. If you answer "NO" to a question, DO NOT put a confidence number.

10 20 30 40 50 60 70 80 90 100
quite uncertain quite certain

___ **(Y/N)** **1. I feel that I will be able to construct a *very poor* web page.**
If you answered **yes**, how confident are you: _____

___ **(Y/N)** **2. I believe that I will be able to construct a *below average* web page.**
If you answered **yes**, how confident are you: _____

___ **(Y/N)** **3. I believe that I will be able to construct an *average* web page.**
If you answered **yes**, how confident are you: _____

___ **(Y/N)** **4. I believe that I will be able to construct an *above average* web page.**
If you answered **yes**, how confident are you: _____

___ **(Y/N)** **5. I believe that I will be able to construct an *excellent* web page.**
If you answered **yes**, how confident are you: _____

LOGIN: _____

Instructions: Please rate each statement on the following scale (1 = Do not agree, to 5 = Agree).

_____ 1. I believe that there are many components to this task.

_____ 2. I believe that a high degree of coordination among the parts of this task is needed.

_____ 3. I feel that there are a number of acts that must be performed.

_____ 4. I feel there are a lot of knowledge and skill requirements needed to complete this task.

LOGIN: _____

TASK: CONSTRUCTING A PERSONAL WEB PAGE

INSTRUCTIONS: You have now been shown how to construct a personal web page, and been given instructions as to what should be included within the web page. Knowing what you need to do, please answer the following question. First, please answer Yes or No to each question. Then, for each question you answered "YES", answer how confident you are in being able to match what the statement says, using the scale below. If you answer "NO" to a question, DO NOT put a confidence number.

10 20 30 40 50 60 70 80 90 100
quite uncertain quite certain

___ **(Y/N)** **1. I feel that I will be able to construct a *very poor* web page.**
If you answered **yes**, how confident are you: _____

___ **(Y/N)** **2. I believe that I will be able to construct a *below average* web page.**
If you answered **yes**, how confident are you: _____

___ **(Y/N)** **3. I believe that I will be able to construct an *average* web page.**
If you answered **yes**, how confident are you: _____

___ **(Y/N)** **4. I believe that I will be able to construct an *above average* web page.**
If you answered **yes**, how confident are you: _____

___ **(Y/N)** **5. I believe that I will be able to construct an *excellent* web page.**
If you answered **yes**, how confident are you: _____

LOGIN: _____

Instructions: Please write down any reasons that may prevent you from completing your web page within the allotted time. Use a separate line for each reason:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____