THE EFFECT OF INDIVIDUAL DIFFERENCES ON TRAINING PROCESS
VARIABLES IN A MULTISTAGE COMPUTER-BASED TRAINING CONTEXT

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THE EFFECT OF INDIVIDUAL DIFFERENCES ON TRAINING PROCESS
VARIABLES IN A MULTISTAGE COMPUTER-BASED TRAINING CONTEXT

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Dissertation

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ABSTRACT

Given the rapid development and implementation of training through E-learning, it is imperative that research examines how trainees learn and perform in this environment. The individual nature of this environment brings into question not only what person factors are important indicators of success in an E-learning environment, but also how these factors impact the training process. Although the traditional training model (Colquitt, LePine, & Noe, 2000) offers a great deal of insight into the training process, this model was largely based on the classroom training environment. As such, this dissertation proposed that a new model was needed to understand the impact of individual differences in the E-learning environment. More specifically, this study examined whether a number of individual difference variables (generalized self-efficacy, learning orientation, optimism, and locus of control) acted as buffers against negative performance feedback in an E-learning module, thus leading to sustained effort and motivation in the training process. One hundred and ninety seven undergraduate students were randomly assigned to experimental groups (positive/negative training performance feedback), participated in two computer based training modules for ambulance drivers, and completed a number of self-report measures. The results indicated that resilience variables were largely unrelated to trainee motivation and performance in either the positive or negative performance condition. The results generally support the tradition
training model in that cognitive ability, motivation, and effort were largely related to performance. The findings appear to indicate that a new resilience model for poor performers may be premature; however, a number of factors suggest future research in this area is warranted.
ACKNOWLEDGEMENTS

It’s hard to think back to when this project began. It seems like a distant past, where an idea for a project slowly changed and grew into the finished product that follows in these pages. Even as I write this section I don’t really feel close to the end, and, yet, I’m so far from the beginning. There are so many people who played a role in my dissertation whom I would like to thank for their patience, assistance, and understanding as I strove to complete this endeavor.

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CHAPTER I  
STATEMENT OF THE PROBLEM

Between 2003 and 2005, the percentage of companies using some form of E-learning to train workers grew from 24% to 33%, and 80% of managers reported that the use of E-learning would continue to grow in 2006 (Bersin, 2005). Additionally, companies in the United States spent over $9 billion dollars on online learning in 2003, and it was projected that organizations would increase their spending 30% per year through 2008, with the number of companies using online learning doubling by 2005 (Freedman, 2004). Part of this increase in spending on E-learning is due to the rising costs of technology and equipment, given its rapid rate of advancement. However, another reason organizations are willing to invest in this type of training is that it offers advantages over traditional classroom-based learning to both the trainee and the organization.

For trainees, such advantages include (but are not limited to) self-paced learning, flexibility of location and time of learning (e.g., employees can remotely access training from any computer with Internet access day or night), and individual feedback that may not be available in a larger classroom setting (Rosenberg, 2001; Rossett, 2002). Organizations also benefit from computerized training. For example, training can be presented in a standardized format, delivery speed is often increased, employee progress
can be monitored electronically, and physical space required for classroom training can be eliminated or used for other purposes (Welsh, Wanberg, Brown, & Simmering, 2003).

Considering the costs of computerized training and its growing use, it is critical that researchers investigate the effects of computers in the training process, as practitioners and researchers alike have a vested interest in the appropriateness of computer-based training. Early research in this area has focused on the features of the technology itself, such as how information is presented and how users interface with the training medium (Kommers, 1996; Yang & Moore, 1995). Other studies investigated factors that might inhibit E-learning performance, such as computer anxiety, computer self-efficacy, and attitudes toward computers (Compeau & Higgins, 1995; Harrison & Rainer, 1992).

Despite growing E-learning research, little research has examined how trainee characteristics impact training performance in a computerized training environment. Researchers have noted that trainee characteristics likely play an important role in e-learning, but few have empirically tested these claims (Brown, 2001; Mumford, Baughman, Uhlman, Costanza, & Threlfall, 1993). Those who have tend to evaluate the impact of dispositional factors on overall training performance but rarely examine how these factors impact the training process, especially in a multistage training situation (Herold, Davis, Fedor, & Parsons, 2002). Many training programs are now multistage, meaning that trainees must complete and demonstrate proficiency in one module of the training before moving forward to more complex material. In this situation, it is possible that some trainees easily pass one stage and move to the next, while other trainees fail
early stages and require additional basic training before moving to more advanced learning.

Of particular interest to this study are those trainees who fail to pass early stages of learning. After failing early training, trainees may respond in a variety of ways. Some trainees may believe that more effort can lead to learning, and thus respond with increased motivation to learn material, perhaps by exerting more effort, paying more attention to the material, or employing some other learning strategy to improve their performance in future modules. Alternatively, trainees may feel incapable of overcoming their performance deficits and thus demonstrate a drop in motivation or interest in learning. For the learner and the organization, it is imperative to understand what factors will lead those who fail early stages of training to increase or decrease their efforts in successive training modules. By identifying these factors, both learners and the organization can find ways to encourage increased efforts toward learning training material.

One aspect of E-learning that may impact trainee motivation is the individual nature of this learning. The majority of E-learning tends to be asynchronous CD or DVD-ROM training (Welsh et al., 2003), where learners complete their training in an individual environment versus the more social environment of the traditional classroom setting. Given the individualistic nature of E-learning, dispositional factors likely play an even greater role in determining trainees’ motivation and performance during training, as trainees must rely on their own coping mechanisms in response to problems that may occur during the training. As such, the primary focus of this dissertation is to examine
which trainee characteristics are most important in maintaining motivation and performance throughout the training process.

Only one study to date has directly examined the importance of individual difference factors on performance in multistage training. Herold et al. (2002) examined the impact of a number of specific Big 5 personality variables (conscientiousness, emotional stability, and openness to experience) on learning in multistage training. The authors found that in a psychomotor skills task (pilot training), dispositional factors had different effects at different stages of training. For example, trainees who struggled in earlier phases of training but had high levels of conscientiousness performed better in later stage training performance. Although an important examination of the effect of dispositional variables on multistage training performance, this research included only a small number of available dispositional variables, did not include key training processes variables, and was limited to flight simulation training.

In a similar line of research, Colquitt and Simmering (1998) studied the impact of goal orientation and conscientiousness on motivation in a classroom setting. The authors found that those students who were learning-oriented and more conscientious persisted after receiving negative performance feedback early in the semester. Additionally, Quinones (1995) found that framing training as either remedial or advanced impacted fairness perceptions and self-efficacy, such that those assigned to advanced training perceived the training to be fairer and had higher self-efficacy, which in turn led to a greater motivation to learn. The implication from these studies is that feedback about early training performance impacts the training process and outcomes, and that there are dispositional variables that appear to influence the training process. The goal of the
current study is to combine these factors into one study to better understand how dispositional variables impact the training process in a computerized training environment.

One can draw a parallel argument for dispositional factors influencing motivation and performance in multistage training from the organizational change literature. Research in this area treats individual learning and training as a type of organizational change (O’Hara & Sayers, 1996). E-learning can be conceptualized as an organizational change microcosm in that training leads to changes in individuals (novice to expert), and multiple individuals changing via training leads to aggregate macro organizational change (less competitive to strategically advantaged). As such, dispositional factors that impact the macro organizational change level may also impact individuals during the micro level change trainees experience during the training process.

A recent body of research has identified a number of dispositional factors that impact organizational change. Cognitive adaptation theory (cf. Aspinwall & Taylor, 1992; Taylor & Brown, 1988) proposes that those individuals with the highest levels of well-being during stressful events are likely to have higher levels of self-esteem, optimism, and perceived control. The organizational change process is often stressful and, as a result, these dispositional variables affect how employees cope with the change. Wanberg and Banas (2000) tested a model where openness to organizational change mediated the relationship between individual difference or resilience variables (self-esteem, optimism, and perceived control) and outcome variables (job satisfaction, work-related irritation, and turnover). The authors found that the dispositional variables did
affect outcome variables, and that the relationship was partially mediated by openness to change.

Similar research by Judge, Locke, Durham, and Kluger (1998) identified a set of core evaluations (e.g., self-esteem, generalized self-efficacy, locus of control) that had relationships with job outcome variables (e.g., affective disposition and job satisfaction). Judge, Thoresen, Pucik, and Welbourne (1999) examined how these variables impact the organizational change process. In general, they found that higher levels of Positive Self Concept (consisting of locus of control, generalized self efficacy, self-esteem, and positive affectivity) were related to greater ability to cope with organizational change, which, in turn, predicted higher job satisfaction, stronger organizational commitment, and better job performance.

One possible criticism of the current study is that it is simply a replication of the generally accepted training model presented by Colquitt, LePine, and Noe (2000). Their model summarizes general training research and highlights a number of individual difference factors that impact the training process, some of which are hypothesized to have a significant effect on training in the current study. However, the current study expanded on the general model in a few key ways. First, this study examined whether individual difference variables served a resiliency function (or, in other words, as a buffer) against poor training performance. To date, no studies have previously investigated resilience to feedback in an E-learning environment. Additionally, this study included two individual difference variables (generalized self-efficacy and optimism) that have largely been overlooked in the training literature. Furthermore, this study utilized a two-cell design (pass/fail the training) to examine whether the impact of these resilience
variables will vary as a function of early performance. It was believed that resilience variables are more important when a trainee performs poorly, and this design allowed for a direct test of this hypothesis. Finally, although the general training model (Colquitt et al., 2000) has been well established for traditional classroom training, much less research has studied the appropriateness of the model for the E-learning environment. It is in this particular environment that resilience variables were expected to have a particularly important effect on the training process.

To summarize, little research has examined the impact of training performance feedback in early stages of computerized training, and both the training and organization change literature suggest that individual difference factors play an important role in the resiliency of trainees in a multistage training process, especially given the individual nature of E-learning. With organizations’ continued investment in E-learning, it is imperative that research examines not only which dispositional factors impact the training process, but also how these factors may facilitate (or hinder) a trainee’s progress from one stage of training to the next. This dissertation extended previous research by 1) including a larger number of individual difference factors that have been proposed to affect motivation and performance, 2) expanding process variables to include time on task and task effort in addition to motivation to learn, 3) controlling for cognitive ability and computer anxiety, and 4) by testing for these effects in a controlled environment using a training program developed for and used by an organization.

More specifically, in the current study it was hypothesized that individual difference variables (generalized self-efficacy, learning goal orientation, optimism, and locus of control) would impact training process variables (motivation to learn, task effort,
time on task), which, in turn, would affect training performance. Additionally, the effect of the individual differences on training process variables was hypothesized to be moderated by performance in early training. To assess the impact of these individual difference variables, participants in this study took part in a multistage ambulance driver training program in which they received feedback about their performance after the first stage of training. Participants either passed or failed the first stage of training, and it was at this point that individual difference variables were hypothesized to function as resiliency variables for some trainees, allowing them to be motivated to learn, exert more effort to learn, and spend more time learning material in the second training session. In turn, this resiliency and sustained motivation to learn should have translated into higher performance in the second stage of training. The following section reviews the literature on the primary variables in this study and describes more specifically how and why individual difference variables (generalized self-efficacy, learning goal orientation, optimism, and locus of control) were expected to be related to training process variables (motivation to learn, task effort, time on task) and training performance.
CHAPTER II
REVIEW OF THE LITERATURE

As seen in the literature, both practitioners and researchers agree that the continuing advances in technology have dramatically changed training and development (Welsh et al., 2003). Research has identified three main influences on learning in organizations: trainee characteristics, training design, and the work environment (Baldwin & Ford, 1988). This dissertation addresses issues primarily related to trainee characteristics. More specifically, this study examines how trainee characteristics impact motivation and effort after poor initial training performance in a multistage computerized training program.

As organizations increase their use of multistage training and continue to capitalize on the advantages of E-learning, research must examine the impact that dispositional variables and early stage training performance have on motivation and subsequent training performance, especially when learners perform poorly in early stages of training. Training research has traditionally examined general trainee readiness factors including self-efficacy, pre-training motivation, Big Five personality factors, and attitudes toward training, among others (Colquitt et al., 2000). However, few studies have examined which trainee characteristics impact trainees’ resilience to poor training performance, and only one study (Herold et al., 2002) has researched the impact of
trainee characteristics in a multistage computerized training situation. Given the self-paced, individualized nature of the majority of E-learning, learner characteristics should impact important training process variables that determine trainee success. Considering the rapid increase in the use of this individualized training delivery method, and the limited training process research, this study offers multiple contributions to the literature.

The following sections will review the literature on E-learning and relevant learner characteristics. First, I will briefly discuss the generally accepted training process model as discussed by Colquitt et al. (2000). Then I will discuss computer-based training issues, focusing primarily on its advantages and disadvantages to learners and organizations. Finally, I will present a discussion of relevant individual difference characteristics and their hypothesized impact on the training process.

Training Process Model

Early training research focused on the effectiveness of training programs based on Kirkpatrick’s (1967) hierarchical model of training outcomes. Kirkpatrick’s hierarchy consists of four levels of training outcomes: 1) a trainee’s reactions to the program, 2) knowledge and skills learned by the trainee, 3) behavior change as a result of learning, and 4) improved results in organizational functioning, such as productivity. Although an important line of study, researchers point out that Kirpatrick’s hierarchy and subsequent research surrounding it failed to examine why training programs are effective for some trainees but not others (Campbell, 1988, Noe, 1986; Noe & Schmitt 1986). These authors highlight the notable absence of trainee attributes and attitudes and their impact on the effectiveness of training programs for both the individual and the organization.
Resulting from this observation, Noe & Schmitt (1986) proposed and tested a new model (See Figure 1)\(^1\) of training effectiveness that incorporated trainees’ attributes and attitudes. At its core, the newly proposed model was a process model in that more distal trainee characteristics were hypothesized to impact mediating training process variables (e.g., trainee’s motivation to learn training material), which, in turn, were hypothesized to influence more distal outcome variables, including learning and transfer of learning to the job. In general, their findings supported their hypothesis that trainee characteristics impact the training process and should no longer be ignored in training research and practice.

Over the next 15 years, a number of studies furthered the examination of trainee characteristics on the training process, and this body of research was neatly summarized in Colquitt et al.’s (2000) training meta analysis. Colquitt et al.’s analysis largely supported Noe & Schmitt’s (1986) process model, finding that trainee characteristics do play an important role in determining a trainee’s motivation to learn, which, in turn, impacts the effectiveness of training, including knowledge acquisition, transfer of learning, job performance, and other factors.

Although largely supported, a number of factors call for further examination of this process model. First, as researchers examined the impact of trainee characteristics on the training process, the training process itself changed due to the introduction of computer-based training. As such, only a limited amount of research has examined how

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\(^1\) This model summarizes Noe & Schmitt’s (1986) and Colquitt et al.’s (2000) training model
Person Characteristics
Self Efficacy
Locus of Control
Conscientiousness

Situational Variables
Climate
Manager Support
Peer Support

Process Variables
Motivation to Learn
Time on Task
Mental Effort

Training Outcomes
Knowledge
Transfer
Job Performance

Job/Career Variables
Job Involvement
Org. Commitment
Career Commitment

Figure 1:
Training Process Model
Trainee characteristics impact the training process in a computer-based training environment. Therefore, it is important for research to examine the impact of trainee characteristics on the training process in a computer training environment, especially given the individual nature of this training. A second limitation of the current training model is the narrow examination of mediating training process variables. Although motivation to learn has been shown to be an important process variable in determining the impact of trainee characteristics on training effectiveness (Colquitt et al., 2000), other process variables deserve consideration (Brown, 2001, Fisher & Ford, 1998). As such, two additional process variables—time on task and mental effort—will be examined in the current study.

E-Learning

The term E-learning is presently the catchall or umbrella term for most types of computer-based learning. E-learning originally referred to “the use of computer network technology, primarily over an intranet or through the Internet, to deliver information and instruction to individuals” (Welsh et al., 2003 p. 250). However, E-learning has expanded to include synchronous (real-time) Web-casts of training material, asynchronous training programs accessible from a remote location or via CD- or DVD-ROM stand-alone programs, and most other technology-based instruction.

Common synonyms for E-learning include computer-based training, technology-based training, and computer-aided learning. Titles of specific Web-based educational technologies, such as Blackboard and WebCT, are often referred to as well. Computerized training designs often utilize the multimedia capabilities of a computer and tend to present training material via CD-ROM, DVD-ROM, and the Internet (Welsh et
al., 2003). Although organizations may use one or many of the previously mentioned types of E-learning, this study focused on the use of asynchronous E-learning.

E-learning in organizations tends to be asynchronous in nature. In this form, training material is static or pre-recorded such that the information is standardized (Welsh et. al., 2003). This type of training is often administered via CD- or DVD-ROM format, or the training material may be stored on a central server accessible to trainees via an intranet or the Internet. Asynchronous training programs often present information using a variety of multimedia formats such as videos, graphs, and text, and research has found that individuals prefer the use of these multimedia features (Richman-Hirsch, Olson-Buchanan, & Drasgow, 2000).

Other forms of computerized learning include Web-based educational packages and distance learning. The aforementioned WebCT and Blackboard programs refer to electronic material that is used to support a traditional classroom format. This may include Web pages with course information, Web links, practice problems, online exams, bulletin boards, chat rooms, and email. Learners enroll in a traditional classroom-based course but are often required to access this supplemental online material as a part of their learning. Distance learning typically refers to learning that occurs through the Internet (Salas, Kosarzycki, Burke, Fiore, & Stone, 2002). This form of learning has traditionally been associated with education since schools offer distance courses that students may enroll in and take from a computer at home or another remote location. Although distance learning tends to be asynchronous in nature, as technology continues to improve, more synchronous or live Web-casts of courses are being offered.
E-learning Advantages

The rapid development and adoption of computerized training technology is due in large part to the advantages this type of training holds over traditional classroom-based learning. For instance, E-learning can be delivered relatively easily across multiple locations. Consider the situation where an organization wishes to implement a three-day training program for 2000 of its employees. The classroom space the organization has available only allows for 30 people to be trained per session. Under these circumstances, it would take the organization approximately 30 weeks to train all 2000 employees. In theory, using a computerized delivery system, all 2000 employees could be trained within one week’s time because trainees could access the training materials from their personal workstations. This increased speed of training translates into advantages for both the organization and the learner.

For the organization, it could mean a competitive advantage over companies that rely on the traditional classroom-based training approach (Salas et al., 2002). A workforce that learns new skill sets or product knowledge faster than its competitors has a clear market advantage. Also, those employees who would have received the training in week 30 will no longer feel behind employees that received training in week one. This equality, in turn, may lead to increased perceptions of justice and transfer of training, as some trainees won’t be left behind others and therefore will be better able to support each other in the transfer of new skills or information.

Other advantages of E-learning include anytime access to training material, tracking of training, self-paced instruction, transportability of workers, cost efficiency, and improved effectiveness (Welsh et al., 2003; Salas et al., 2002). As long as employees
have access to a computer and/or the Internet, they can train from virtually anywhere. This could help employees resolve work, family, and personal scheduling problems (Johnson, 1999). Also, employees can learn from the comfort of their own home or while they are traveling for business purposes.

Organizations can also better track employee training progress as computers can monitor and log when trainees learn, what they learn, and how well they learned the material. Organizations can then link successful completion of training to rewards, which could motivate those who have yet to complete training. Also, managers could link performance evaluations to training records and quickly access and recommend particular training courses to those employees who are underperforming. One concern for tracking is whether or not employees actually complete the training themselves versus having someone do it for them. Security features should be included to ensure that persons completing the training are indeed who they claim to be.

The self-paced nature of E-learning is often touted as an advantage to learners. Self-paced instruction shifts the responsibility of learning to the learner, since a traditional instructor is not present. As such, E-learning allows trainees to complete the training at a pace that best suits the trainees’ needs. Therefore, trainees can often fast-forward through information they already know, or rewind training indefinitely until they thoroughly learn the material. Also, trainees have the choice to engage in extra practice work outside of the primary material, and doing so has important effects on trainee performance (Brown, 2001).

Another advantage of anytime access to training is that workers can become highly skilled in many areas. As a result, workers become more transportable from one
company to another (Salas et al., 2002). Given current economic conditions and the rarity of traditional job stability, workers need to continually learn new skills in order to remain competitive in the job market. Thus, access to training allows employees to retain marketability.

E-learning appears to be a cost-efficient alternative to classroom-based training, especially when organizations need to train a large number of geographically diverse individuals (Welsh et al., 2003). E-learning can save organizations money in terms of both direct and indirect costs. Although expensive to develop (Chapnick, 2001) because of technology and IT staffing costs, research has shown that E-learning can be less costly than traditional classroom training (Phelps, Rosalie, Ashworth, & Hahn, 1991; Whalen & Wright, 2000) due to savings in travel, lodging, meals, printed materials, classroom and building space, instructors, and potential reduced learning time (Janniro, 1993).

Finally, some research has demonstrated that E-learning leads to improved performance and, in some cases, may lead to higher levels of performance compared to classroom-based learning. Brown (2001) demonstrated that manufacturing employees taking a two-day intranet-delivered problem-solving course improved their knowledge from pre-test to post-test. Williams and Zahed (1996) introduced a computer-based safety-training program to a pharmaceutical manufacturing site and found that retention after one month was significantly higher in the computer-based training group than in the traditional lecture-based training group.

Further evidence from two military training studies indicated that computer simulations improved 1) job-specific decision-making skills for marine officers (O’Hara, 1990), and 2) flight performance of cadets compared to a group that did not use the
simulation (Gopher, Weil, & Bereket, 1994). Additionally, Bramble and Martin (1995) found that technical training courses using two-way interactive video improved performance on achievement tests. Meta analytic evidence (Kulik & Kulik, 1991) suggests a .25 standard deviation advantage of computer-based learning compared to classroom-based instruction. Researchers note, however, that the results of these studies may be tempered by computer anxiety and self-efficacy (Martocchio, 1994; Gist, Schwoerer, & Rosen, 1989) and that methodological constraints warrant cautious interpretation (Clark, 1994) because differences in effectiveness may be a result of training program dissimilarity.

**E-Learning Disadvantages**

Although E-learning offers many advantages over traditional classroom training, there are also a number of drawbacks to consider. One primary drawback is the cost of designing and implementing a successful E-learning system. Research suggests that organizations that wish to develop a successful E-learning system need to spend considerable time planning the design and development of E-learning, because technology and staffing costs tend to be high (Welsh et al., 2003; Kruse & Keil, 2000). Additionally, as course materials need to be updated, CD- and DVD-ROM E-learning is considerably more time-consuming and costly to revise.

Another drawback to E-learning is the adoption of a mindset that all electronic learning is training. Dobbs (2002) suggested that organizations and trainees should stop pretending that reading is training. Organizations should be wary of assuming that learners will absorb material just because it is presented electronically. Training is a process that requires practice, feedback, and effort, and, as such, simply providing
information through a more easily accessible medium does not ensure that trainees will learn the material.

For some, E-learning is a new and complex learning environment that may frustrate learners and lead to problems during training. Given the individual nature of the training, assistance may not be readily available to help learners deal with barriers in the learning environment (Desai, Richards, & Eddy, 1999). Additionally, not all learners may recognize the benefits of a self-paced learning environment. The effects of learner control in a self-paced environment can only be realized if learners choose to exert effort into mastering the material. Not all trainees choose to take advantage of this and, therefore, limit their learning (Brown, 2001).

Finally, given the nature of E-learning, trainees will typically lack the traditional social environment of classroom-based training. Trainees in a classroom environment can offer support to each other as they experience difficulties during the training. Research has shown that social support is a key factor to reduced stress and increased well being during organizational change (Wanberg & Banas, 2000), and it likely impacts the training process as well. Fortunately, as technology continues to develop, trainees will increasingly have access to help via online chat programs and bulletin boards so that they can receive immediate solutions to problems encountered during training. However, this speaks to the importance of considering individual difference variables in analyses of E-learning effectiveness, as individual employees may need to function as their own source of support and self-regulate through the process.
**Generalized Self-Efficacy**

Wood and Bandura (1989, p. 408) described self-efficacy as “beliefs in one’s capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands.” Bandura (1986) noted that four broad categories of experiences (personal attainment, vicarious learning, verbal persuasion, and physiological arousal) contribute to the formation of efficacy judgments. Cognitive appraisal of these factors leads to an overall judgment of one’s capabilities for completing a task. This judgment or appraisal constitutes one’s self-efficacy.

Bandura also theorized that self-efficacy expectations vary on three dimensions: magnitude (relative task difficulty), strength (dissipation of efficacy given disconfirming experiences), and generality (specificity of efficacy beliefs). Most self-efficacy research has focused on task-specific efficacy, such as career choice (Lent, Brown, & Larkin, 1987), math ability (Schunk, 1983), faculty research productivity (Taylor, Locke, Lee, & Gist, 1984), work-specific self-efficacy (Schwoerer, May, Hollensbe, & Mencl, 2005), and training self-efficacy (Chuang, Liao, & Tai, 2005; Colquitt et al., 2000). As such, this research has intentionally or unintentionally focused on the magnitude and strength aspects of self-efficacy, but has largely ignored the generality component.

A growing body of literature has drawn attention to the generality component of self-efficacy, arguing that a more dispositional self-efficacy construct functions as a more general estimation of one’s capability to perform tasks (Lennings, 1994; Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, & Rodger, 1982; Judge et al., 1999). These and other researchers theorize that individuals have self-efficacy for a number of different specific tasks, and that from these task-specific efficacy beliefs one develops a more
global or dispositional sense of one’s capability to perform tasks in general across a variety of situations and circumstances.

A number of studies have examined and supported the existence and utility of a more generalized self-efficacy construct. Sherer et al. (1982) examined the construct validity of a measure of generalized self-efficacy. Their analysis revealed a two-factor structure, one representing general self-efficacy (which accounted for 26.5% of the variance), and the second factor representing social self-efficacy (which accounted for 8.5% of the variance). Additionally, the minimum factor loading was .40, and item loadings averaged .55 for factor 1, and .60 for factor 2. The authors concluded that these results provide evidence of acceptable factor structure for this scale. The authors also examined the relationship between generalized self-efficacy and a number of other constructs. Results indicated that generalized self-efficacy mildly positively correlated with an internal locus of control ($r = .29$), ego strength ($r = .29$), and interpersonal competency ($r = .45$). The authors noted that the magnitude of these correlations is appropriate and indicate of the relative independence of generalized self-efficacy from other variables. Additionally, Sherer et al. demonstrated criterion validity in that higher generalized self-efficacy predicted a higher rate of employment, education level, and military rank, and lower levels of turnover and number of times fired.

Tipton and Worthington (1984), Lennings (1994), and Schwarzer, Mueller, and Greenglass (1999) provided additional construct validity for generalized self-efficacy. These authors conceptualized generalized self-efficacy from a therapeutic standpoint as being tied to psychological resilience. Individuals with a greater sense of global self-efficacy feel they can succeed in numerous situations, and thus would have a higher
resiliency to failure in a specific task. Lennings (1994) demonstrated that generalized efficacy beliefs were correlated to other agency variables, including locus of control and achievement, but were relatively unrelated to three temperament variables: self-control, impulsivity, and sensation seeking. Tipton and Worthington (1984) showed that individuals with higher levels of generalized self-efficacy persisted longer in both an uncomfortable physical endurance task and a self-chosen behavior modification task.

More recently, Luszczynska, Scholz, and Schwarzer (2005) examined the validity of the Generalized Self-Efficacy Scale (Schwarzer & Jerusalem, 1995) in three countries and provided a summary of previous validity evidence. This study noted the positive relationships with constructs including global quality of life ($r = .24$), active coping ($r = .27$), planning, ($r = .33$), intention to train/exercise ($r = .64$), and negative relationships with variables including depressive symptoms ($r = -.39$), tiredness ($r = -.36$), and passive coping ($r = -.25$). More specifically related to the current study, Chen, Gully, and Eden (2006) demonstrated that generalized self-efficacy predicted motivation ($r = .33$) of students to learn course material in an upper-level psychology class.

Further research evidence has examined general self-efficacy in an organizational context. Schwoerer et al. (2005) studied generalized self-efficacy as an outcome variable in a classroom-based training situation. The authors hypothesized that pre-training cognitions and learning during the training would lead to increased work-specific self-efficacy but would have no affect on generalized self-efficacy post training. Their findings indicated that the training did increase work-specific self-efficacy; however, contrary to their hypothesis, the training increased participants’ general self-efficacy as well. Also, this study only examined generalized efficacy as an outcome variable and did
not consider the effect it would have as a predictor variable on training motivation and performance.

Within the organizational change literature, researchers have examined predictors of openness to or acceptance of organizational change (Judge et al., 1999; Oreg, 2003; Wanberg & Banas, 2000). This research has identified a number of variables linked to a successful change process, and among them, Judge et al. demonstrated the effectiveness of generalized self-efficacy. Judge et al. conceptualized generalized efficacy similarly to Tipton and Worthington (1984), Lennings (1994), and Stumpf, Brief, and Hartman (1987), and argued that generalized self-efficacy serves as a resilience variable that allows individuals faced with uncertainty or potential failure to persist. Judge et al.’s research demonstrated that those with higher levels of generalized efficacy coped with the stress of organizational change better. In turn, coping was positively related to career outcomes including salary, job satisfaction, organizational commitment, and others.

These findings have implications for multistage computer-based training. As previously mentioned, research has conceptualized training as a form of organizational change (O’Hara & Sayers, 1996) and, therefore, variables impacting the organizational change process may also affect the training process. Given the lack of social support in computer-based training, one’s internal disposition will likely play an important role in how one interprets feedback about performance information during training. Thus, similar to the manner in which generalized self-efficacy functions as a resiliency variable for those experiencing organizational change, one’s generalized sense of efficacy should buffer the effects of negative performance feedback during the training process, allowing trainees to maintain levels of motivation and performance in later training stages. As
such, for those trainees who receive negative feedback about their performance in the first stage of training, there should be a moderate positive relationship between generalized self-efficacy and training process variables (motivation to learn, time on task, and task effort). Those with higher levels of self-efficacy should demonstrate resiliency by maintaining levels of motivation to learn, spending more time on task, and exerting greater task effort, while those with lower levels of generalized efficacy will lack resiliency, thus demonstrating lower levels of motivation and effort. For those trainees that receive positive feedback, generalized efficacy should demonstrate a smaller relationship to training process variables given that trainees would believe that they were capable of performing well in the second training session. As such, there should be a small but significant positive relationship between generalized self efficacy and training process variables for those receiving positive feedback about their training performance.

**H1a:** Generalized self-efficacy will be positively related to training process variables (motivation to learn, time on task, and task effort).

**H1b:** The relationship between generalized self-efficacy and training process variables (motivation to learn, time on task, and task effort) will be moderated by the type of feedback received (positive/negative), such that the relationship is stronger in the negative feedback condition (see Figure 2).

**H1c:** Process variables (motivation to learn, time on task, task effort) mediate the relationship between generalized self-efficacy and training performance.

Given the well-supported relationship between more task-specific self-efficacy (i.e., training self-efficacy) and training motivation (Colquitt et al., 2000), it is important to assess the relative predictive utility of generalized self-efficacy. As such, the current
study also includes a task-specific measure of self-efficacy in order to test the added value of generalized self-efficacy to the training process model.

H1d: Generalized self-efficacy will predict training process variables (motivation to learn, time on task, and task effort) above and beyond a task-specific measure of self-efficacy.

![Proposed Generalized Self-Efficacy Interaction Effect](image)

Figure 2:
Proposed Generalized Self-Efficacy Interaction Effect

**Goal Orientation**

A growing body of literature has examined the manner in which individuals pursue various goals. One empirically supported framework for understanding goal pursuit has identified two general types or classes of goals: learning goals and performance goals (Dweck & Leggett, 1988; Dweck, 1989; Dweck, Hong, & Chiu, 1993). Individuals who approach a task with a learning orientation adopt a mastery focus
such that they strive to increase their level of competence or understanding of material. They also tend to hold the belief that task success is primarily determined by effort (Duda & Nicholls, 1992). Those adopting a performance orientation are more concerned with demonstrating proficiency in order to gain positive evaluation from others and believe that ability leads to goal completion.

These two approaches to goal pursuit often result in different patterns of behavior during goal striving. Learning-oriented individuals often seek challenge and are not deterred by failure. Poor performance or failure operates as important feedback regarding the learning process in that it provides information about why or where goal pursuit failed. This feedback often leads learners to change their current strategy, thus demonstrating adaptation (LePine, 2005). During training, learning-oriented individuals tend to focus on the development and refinement of skills and may be more likely to experiment with new strategies in order to master material (Davis, Carson, Ammeter, & Treadway, 2005). Also, learning-oriented persons tend to demonstrate higher levels of motivation to learn, which, in turn, leads to better performance and skill transfer (Fischer & Ford, 1998; Chiaburu & Marinova, 2005).

Alternatively, performance-oriented persons tend to demonstrate maladaptive or helpless response patterns during learning. This type of behavior includes avoiding challenging tasks and decreased task performance (Dweck & Leggett, 1988). Additionally, negative performance feedback can lead to negative self-thoughts that shift attention away from task performance and strategy adjustment. Thus, those high in performance orientation are more likely to experience negative emotions and disengage from a learning activity (Button, Mathieu & Zajac, 1996).
Research suggests that the different behavior between learning and performance-oriented individuals exists, in part, due to individuals’ implicit theories regarding ability (Dweck & Leggett, 1988). Learning-oriented learners tend to believe ability is malleable and can be improved through continued effort and persistence. Therefore, task failure serves as an indication that more effort or a new learning strategy is required in order to successfully reach one’s goal. Alternatively, performance-oriented persons subscribe to an entity view of ability. These individuals perceive ability to be a fixed and largely innate attribute that is essentially unchangeable. For those high in performance orientation, negative performance feedback indicates a lack of necessary ability to complete one’s goal. Because performance-oriented individuals tend to see ability as a stable, unchangeable construct and view ability as the primary determinant of success, a typical response to negative feedback is avoidance or disengagement from the task, since these individuals believe their task ability cannot change.

Early research on goal orientation focused on providing empirical validation for the two types of goals as well as confirming their theoretical suppositions. Henderson and Dweck (1990) demonstrated that students who hold an entity theory of intelligence tend to attribute task failures to a lack of ability, whereas those with incremental views of ability attribute performance to effort and strategy. Hong and Dweck (1993) reached similar conclusions about performance attributions when they manipulated feedback given to college students about their performance on a conceptual ability task. Hong and Dweck’s research utilized both self-reported and a more objective measure of ability inference (reaction time to adjectives related to performance) that add to the empirical support of the theory.
Other research focused on identifying the cognitive and affective differences between learning- and performance-oriented individuals. Diener and Dweck (1978, 1980) examined the changes in cognition of students while working on tasks where students successfully completed a first set of easier items but failed to solve a second, more difficult set of problems. These researchers discovered that the participants used effective problem-solving strategies during the first set of problems, and that there were no differences between learning-and performance-oriented participants. During the set of problems where students failed, however, distinct differences were observed between learning- and performance-oriented persons. Performance-oriented students reported negative self-thoughts regarding their inadequacy or lack of intelligence or ability, which were accompanied by negative affect, anxiety, and boredom. Contrastingly, those identified as learning-oriented made few attributions about their failure and did not appear to believe they were actually failing. These students began to exert more task effort and engage in self-monitoring processes aimed at identifying where their strategies had failed. These students also maintained an optimistic outlook and recognized that they succeeded on earlier trials and thus were capable of future success.

Based on the different perceptions of these students, Elliot and Dweck (1988) believed that learning- and performance-oriented persons might be pursuing different goals. To test this hypothesis, Elliot and Dweck induced a learning or performance orientation and manipulated learners’ assessments of their ability (high vs. low) by providing feedback. Participants were then asked to choose from a number of tasks that represented either a learning or performance orientation. Results showed that for children oriented toward a learning perception, their level of ability had little impact on
their task choice, as they largely selected the learning-oriented task that emphasized increased competence. Those oriented towards performance goals, however, demonstrated different task choices based on the ability manipulation. Those in the high ability performance condition chose a challenging task that allowed them to receive judgments about their competence, while those in the low ability performance condition selected easier tasks where they could avoid negative evaluations.

Two points of concern are worth noting regarding the goal orientation literature. First, early research on goal orientation focused on school children, which raises questions about generalizability. Second, many researchers have debated the structure of the learning orientation construct, and more current research supports a three-factor structure (DeShon & Gillespie, 2006; Elliot & Church, 1997; VandeWalle, 1997).

Regarding the generalizability of results, more recent research has examined goal orientation using adult samples in both college and organizational settings. Colquitt and Simmering (1998) investigated the effect of learning orientation and conscientiousness on college students’ motivation to learn through a six-week course. Their findings indicated that learning orientation was positively related to motivation to learn throughout the semester regardless of feedback about their performance levels, whereas performance orientation was negatively related to motivation after feedback was given. Fischer & Ford (1998) examined how goal orientation and learner effort impact learning outcomes. Participants learned how to use a prediction model in order to assess the potential of various stocks in their respective stock markets. Results demonstrated that the learning-oriented approach positively correlated with mental work effort, while a performance approach was related to higher levels of off-task attention. In turn, mental work effort and
time on task were positively related to performance and, as expected, more off-task attention was associated with lower levels of performance.

Additional research has linked goal orientation to pre-training motivation, skill transfer, and adaptive team performance. Chiaburu & Marinova (2005) tested a model examining the links between goal orientation, organizational support, training self-efficacy, pre-training motivation, and skill transfer. The authors examined these relationships via employees who participated in a day-long corporate information training course. As predicted, a mastery approach to training was positively related to pre-training motivation to learn. Additionally, pre-training motivation mediated the relationship between skill transfer and goal orientation. LePine (2005) extended goal orientation research by examining the effects of aggregated team levels of goal orientation. LePine’s findings showed that teams that were highly performance-oriented showed more communication problems and withdrawal from the task following an experimentally introduced task disruption. Teams with high levels of learning orientation demonstrated a different pattern of behaviors following the disruption. These teams engaged in self-monitoring of goal progress, communicated more constructively, and continued to persist in goal pursuit.

Although there is some debate regarding the dimensionality of the goal orientation construct (Deshon & Gillespie, 2006), more recent research supports a three-factor structure over the traditional two-dimensional mastery and performance distinction (Brett & VandeWalle, 1999; Elliot & Church, 1997; VandeWalle, 1997). Researchers suggested the integration of goal orientation and an approach-avoid motivation framework. The rationale for this marriage argues that the performance orientation
dimension should distinguish between those seeking to demonstrate competent performance (performance approach) and those whose goal is to avoid demonstrating incompetence (performance avoid). And although some research suggests a complete marriage, whereby mastery orientation incorporates an approach and avoidance distinction (Elliot & McGregor, 2001; Pintrich, 2000), the use of a four-factor structure seems premature given the limited support for this conceptualization and the goals of the current study.

DeShon & Gillespie’s (2006) review of the goal orientation literature identified 23 studies that used a three-factor operationalization of goal orientation, and within these, a number demonstrate the utility of this conceptualization over the traditional two-factor view. For example, VandeWalle (1997) developed a three-factor measure and demonstrated through confirmatory factor analysis and correlational results that the three-factor model fit the data significantly better than the two-factor model, and the three factors correlated differentially with other variables including work and family orientation, fear of negative evaluation, feedback seeking, and implicit theories of intelligence. Additionally, Brett & VandeWalle (1999) examined the impact of goal orientation in a training program. Their findings further supported the use of a three-factor structure, in that the three factors differentially predicted specific training goals (development, refinement, comparison, and avoidance), which were, in turn, variably related to overall training performance.

Elliot and Church (1997) and Elliot and Thrash (2002) further demonstrated the utility of the three-factor conceptualization of goal orientation. Elliot and Church developed a three-factor measure of goal orientation and demonstrated that, as
hypothesized, the antecedents of goal orientation (achievement motivation, competence expectancy, and fear of failure) had varying relationships with the three dimensions of goal orientation, and in turn, the goal orientation dimensions predicted intrinsic motivation and graded performance differently. Mastery goal orientation was positively related to intrinsic motivation, performance approach was negatively related to graded performance, and performance avoid was negatively related to intrinsic motivation and graded performance. Given the demonstrated distinction between and utility of conceptualizing goal orientation from a three-factor perspective, the current study adopted this operationalization.

A point of concern for the current study is the relationship between goal orientation and motivation to learn information in training after receiving feedback about initial training performance. Research has examined the relation between goal orientation and feedback seeking (VandeWalle, 2003), but the research on goal orientation and motivation has typically either adopted a two-factor operationalization (Colquitt & Simmering, 1999) or has not provided feedback to trainees about their performance (Chiaburu & Marinova, 2005). As such, hypotheses regarding the relationship between goal orientation and motivation following feedback draw primarily from the implicit theory perspective of goal orientation.

In sum, goal orientation research has clear implications for a multistage computer-based training scenario. As trainees receive feedback about their performance, their goal orientation should impact training process variables. Those who are mastery oriented should maintain levels of motivation, spend more time on task, and exert greater effort when given positive or negative feedback. Those receiving positive feedback should
continue to be motivated due to intrinsic reasons. Trainees receiving negative feedback should sustain motivation since they would not perceive the feedback as an indication of a lack of ability, but rather that more effort is required to master the material. Alternatively, the relationship between performance orientation and training process variables should be moderated by feedback condition. In the negative feedback condition, performance approach and performance avoidance should be negatively related to training process variables, because the negative feedback signals a lack of ability that cannot be overcome via increased effort. In the positive feedback condition, performance approach and performance avoidance should be positively related to the training process variables, as these individuals will want to continue to demonstrate proficiency or avoid demonstrating incompetence, respectively.

H2a: Mastery orientation will be positively related to motivation to learn, time on task, and task effort in both the positive and negative feedback conditions.

H2b: The relationship between performance approach orientation and training process variables (motivation to learn, time on task, and task effort) will be moderated by the type of feedback received, such that the relationship will be positive in the positive feedback condition, and negative in the negative feedback condition (see Figure 3).

H2c: The relationship between performance avoidance orientation and training process variables (motivation to learn, time on task, and task effort) will be moderated by the type of feedback received, such that the relationship will be stronger in the negative feedback condition (see Figure 4).

H2d: Process variables (motivation to learn, time on task, and task effort) will mediate the relationship between goal orientation (learning and performance) and training performance.

In addition to the primary hypotheses, a number of exploratory hypotheses are posited. These hypotheses are exploratory in nature for a number of reasons. First,
although the relevant literature generally supports these hypotheses, there are few direct studies examining differential relationships across experimental conditions. Additionally, the power requirements to directly test these exploratory hypotheses are beyond the current study. As such, results from the tests of these hypotheses can provide insight into future research that could more directly assess their veracity.

**EH1:** The strength of the relationships between goal orientation and training process variables (motivation to learn, time on task, and task effort) will vary such that in the positive feedback condition mastery orientation will demonstrate the strongest positive relationship, performance approach the second strongest, and performance avoid the weakest.

**EH2:** The strength of the relationships between goal orientation and training process variables (motivation to learn, time on task, and task effort) will vary such that in the negative feedback condition mastery orientation will demonstrate a strong positive relationship, performance avoid a strong negative relationship, and performance approach a moderate negative relationship.

![Proposed Performance Approach Interaction Effect](image)

**Figure 3:**

Proposed Performance Approach Interaction Effect
Optimism

People vary widely in their expectations about the world around them. Some individuals tend to expect things in life to go their way, while others believe that bad things are more likely to occur. In general, research has defined these two different worldviews as optimism and pessimism. However, there has been some debate about the theoretical nature of optimism and pessimism, and research has examined and provided support for different theoretical perspectives. Therefore, I will briefly present the three theoretical perspectives regarding optimism and pessimism. Then, I will present research findings linking optimism and pessimism to important outcome variables. Based on this research, I will present hypotheses for the present study.
Dember, Martin, Hummer, Howe, and Melton (1989) provided the broadest theoretical definition of optimism. These authors defined optimism and pessimism as a general tendency to view the self in either positive or negative terms. So, one tends to expect generally good (optimistic) or bad (pessimistic) outcomes in the future based on one’s self view. Dember et al. developed a measure (the O/P Instrument) that assesses optimism and pessimism as distinct constructs. Some factor-analytic research has supported this conceptualization of optimism/pessimism (Reilley, Geers, & Dember, 1997). However, other research has criticized this broad perspective and has shown that the OPI is highly related to other constructs such as self-esteem and hope (Chang, D’Zurilla, & Maydeu-Olivares, 1994).

The second theoretical perspective draws from the Reformulated Learned Helplessness Theory, which posits that the habitual ways in which people explain life events form a cognitive-based individual differences variable called “explanatory style” (Abramson, Seligman, & Teasdale, 1978). Individuals who are considered pessimistic tend to believe that negative events are primarily caused by internal (their own fault), global (will undermine everything they do), and stable (persistent over time) factors, while positive events are due to external, specific, and unstable factors. Optimists demonstrate an opposite explanatory pattern, as they are able to generate specific reasons for the occurrence of negative life events and believe that negative events are caused by unstable external forces, while, alternatively, optimists view positive events as being due to internal, global, and stable factors. Under this conceptualization, researchers indirectly assess an individual’s optimism, based on one’s explanatory style, using the Attributional Style Questionnaire (Seligman, Abramson, Semmel, & von Baeyer, 1979). Research has
questioned this approach and has shown that other conceptualizations have stronger expected empirical relationships with relevant outcome variables including health, depression, and coping (Reilley, Geers, Lindsay, Deronde, & Dember, 2005).

The most widely accepted and empirically supported theory of optimism views optimists as those who generally expect things to go their way and that good, rather than bad, things are likely to happen. These expectancies about life events are hypothesized to operate within a general model of self-regulation (Scheier & Carver, 1985). This model suggests that goal-directed behavior is guided by a hierarchically organized set of closed-loop negative feedback systems that becomes more fully engaged as attention is drawn to the self. When a person focuses inward, he or she will engage in a process that checks for discrepancies between current and goal states. A large discrepancy indicates that one is further away from the goal state, and this, in turn, motivates behavior and/or the expenditure of energy and resources aimed at reducing the discrepancy. However, as one begins to reduce the discrepancy, it is often the case that one recognizes barriers that may impede goal pursuit (Weiner, Freize, Kukla, Reed, Rest, & Rosenbaum, 1971).

According to the model, the recognition of barriers leads to an assessment of outcome expectations. This point of expectation assessment is where trait optimism exerts its influence. In this case, optimists will generally evaluate barriers as being surmountable, and thus continue to engage in behavior aimed at reducing the discrepancy between the current and goal state. Pessimists, however, are more inclined to believe that goal obstacles are impassable, and thus avoid or disengage from goal pursuit.

Stemming from this conceptualization, Scheier and Carver (1985) developed the Life Orientation Test (LOT) designed to measure dispositional optimism or generalized
future outcome expectations. Since the development of this scale, a number of studies have examined its validity and reliability, with the majority of the research supporting its utility. Scheier and Carver found that higher level of optimism was associated with an internal locus of control, higher self-esteem, and lower levels of hopelessness, depression, and perceived stress. Additionally, their factor-analytic evidence demonstrated that the LOT was distinct from measures of locus of control, self-esteem, and depression, including trait affectivity, hope, and others (Steed, 2003).

Other research has focused on examining how optimism affects other important outcome variables. Most of this research has examined the relationship between optimism and health-related variables (Carver & Gaines, 1987; Carver, Pozo, Harris, Noriega, Scheier, Robinson, et al., 1993). The majority of this research indicates that optimists employ active coping strategies that are linked with improved health. Major, Richards, Cooper, Cozzarella, & Zubek (1998) examined how personal resilience (including optimism) was related to cognitive appraisals, coping strategies, and decision satisfaction of women who chose to have abortions. The study found that higher levels of optimism were associated with less threatening appraisals of the abortion process and higher perceived levels of resources for dealing with the threat. Optimism also appears to have positive effects for cardiac patients, as research indicates that optimistic patients have superior physical recovery and emotional well being (Bedi & Brown, 2005; Helgeson, 1999). In addition, those higher in optimism took fewer sick days from work after a change in health or death in the family, whereas pessimists tended to be absent more often and for longer periods of time (Kivimaki, Vahtera, Elsvainio, Helenius, Sing-Manouk, & Pentti, 2005).
Research has also explored the relationship between optimism and outcome variables in other settings as well. Aspinwall and Taylor (1992) studied the effects of optimism on the success of college students. Their results demonstrated that optimism was the only variable that had an independent effect on college adjustment and was related to greater use of active coping and lower levels of avoidance coping.

Organizations have also begun to study the impact of optimism on work-related variables. Makikangas, Kinnunen, and Feldt (2004) examined optimism in relation to employee mental and physical distress. Optimism and self-esteem (as parts of personal resilience) at time 1 were negatively related to mental distress and physical symptoms, positively related to resilience at time 2, and negatively related to mental distress at time 2.

Additional evidence links optimism to coping, stress, and burnout. Tuten and Neidermeyer (2004) found that optimism among call center workers predicted lower levels of role and work-life conflict stress. Similarly, Riolli and Savicki (2003) observed a strong relationship between optimism and decreased burnout in information service workers. Optimism had a main effect on two components of burnout, emotional exhaustion and depersonalization, such that those with higher levels of optimism were less emotionally drained and felt that coworkers treated them in a more feeling and personal manner. Additionally, for those workers with fewer available resources (social support, supervisor support, etc), optimism served as a buffer against burnout. Finally, organizational change research has identified optimism as an important variable for coping with the change process. Wanberg and Banas (2000) demonstrated that personal
resilience (optimism, self-efficacy, and perceived control) was positively related to acceptance of an organizational change, which, in turn, predicted job satisfaction.

Although no studies have examined the influence of optimism in the training process, the findings from research on optimism suggest a number of implications for training. Similar to the literature on coping with stress and organizational change, optimism may impact one’s interpretation of training feedback. For those who receive negative performance feedback, an optimistic view may buffer against this negative information. Those with an optimistic view may continue to believe they can successfully learn material despite initial negative feedback. Pessimists, however, are expected to disengage from learning given their general belief that negative things will happen, and thus future effort toward learning would likely be unsuccessful. Similar to generalized self-efficacy, optimism should be less related to training process variables for those individuals who receive positive feedback about their stage one training performance.

H3a: Optimism will be positively related to training process variables (motivation to learn, time on task, and task effort).

H3b: The relationship between optimism and training process variables (motivation to learn, time on task, and task effort) will be moderated by the type of feedback received (positive/negative), such that the relationship will be stronger in the negative feedback condition (see Figure 5).

H3c: Process variables (motivation to learn, time on task, and task effort) will mediate the relationship between optimism and training performance.
Figure 5:

Proposed Optimism Interaction Effect

*Locus of Control*

Research has typically defined locus of control as a personality trait that describes beliefs about the source of control of events (Lau & Woodman, 1995; Newton & Keenan, 1990; Rotter, 1966). Individuals with a strong internal locus of control believe that they exert control over their environment. For example, one who is internally locused believes that a positive job performance review is a function of internal factors such as motivation and hard work. Alternatively, individuals with a strong external locus of control believe that events affecting them are largely controlled by external forces such as powerful others, luck, chance, fate, etc. In this case, a worker receiving a positive job performance review would attribute this to external factors such as their supervisor liking them or the lower quality work of coworkers.
Research on the locus of control construct has often focused on its utility as a coping mechanism or form of resiliency against experiencing stress. The rationale for this research is that those who perceive personal control (internal locus) over their environment will be better able to cope with stress, as personal control allows an individual to directly deal with or change the stressor. People with an external locus, however, would perceive the stressor as something out of their control and thus be unable to alter the impact of the stressor (Newton & Keenan, 1990). It follows, then, that a number of studies have examined the relationship between locus of control, stress, and illness.

Kobasa (1979) examined these relationships on a number of middle- and upper-level executives of a large public utility company. Participants were grouped into high stress/low illness and high stress/high illness groups to determine which factors differentiated coping with stress and resulting illness. Kobasa found that those in the high stress/low illness group were significantly more internally locused, indicating that internals appear to deal with stress better than externals. Kobasa (1982) again examined the relationship between perceived control, stress, and illness resilience among lawyers. The findings of this study supported previous work in that perceived personal control over stress was significantly related to reduced illness. Newton & Keenan (1990) provide more recent evidence that locus of control relates to psychological strain. These authors examined the moderating effects of locus of control on the relationship between job demands and stress. The results indicated that, in general, externals experienced more strain than internals, and that for externals, those who experienced role ambiguity tended to have higher levels of frustration, anger, and hostility strain. Internals were more likely
to experience stress at work due to role conflict and having a quantitatively high work load (overload).

An important explanation as to why internals experience less stress are the types of coping strategies they would employ to deal with stressors. The research in this area has repeatedly shown that internals tend to utilize active or task-focused coping, whereas externals tend to engage in emotion-based coping. Anderson (1977) examined the link between locus of control and coping styles on small business owner-managers in a community that had recently dealt with a flood that had a significant impact on the economy of the region. The findings indicated a strong relationship between internal locus of control and Class I coping behaviors, such as problem solving, aimed at dealing with the objective task situation. External locus of control was highly related to Class II coping behaviors that include emotional responses such as withdrawal. Similarly, Parkes (1984) examined coping behaviors (general coping, direct coping, and suppression) among nursing students. The study showed that nursing students with an internal locus of control used more direct means of coping with stress and less frequently adopted suppression as a means of coping compared to externals.

More recent literature has applied the findings of these earlier studies to an organizational setting. One implication from these studies is that one’s control perceptions likely impact how one deals with change in the workplace. Both Lau and Woodman (1995) and Nelson, Cooper, & Jackson (1995) argued that personality factors probably influence how workers deal with organizational change. The organizational change process is often seen as stressful to workers, because it can lead to feelings of uncertainty about the future, fear of failure at new task requirements, and concerns about
job security (Wanberg & Banas, 2000). Thus, individual difference factors may influence how resilient workers are to the stress of organizational change.

Lau and Woodman’s research examined the influence of a number of personality variables on workers’ schemas regarding change and their attitudes toward the change. One of their stronger findings was the mediating effect of change schema on the relationship between locus of control and attitudes toward change, indicating that locus of control is an important predictor of cognitions about and attitudes toward the change process. Judge et al. (1999) and Wanberg & Banas (2000) furthered this research by examining the impact of personality characteristics not only on attitudes toward change, but also on important change outcomes.

Judge et al. (1999) identified two sets of dispositional traits, Positive Self Concept (including locus of control) and Risk Tolerance. Of particular interest were the findings that the relationship between Positive Self Concept and career outcomes (salary, job satisfaction, organizational commitment) was mediated by coping strategies. More specifically, an internal locus of control was positively related to coping with the change, which then predicted important career outcomes. Similarly, Wanberg and Banas (2000) examined the impact of a number of dispositional (self-esteem, optimism, perceived control) and contextual (information, participation, social support) variables on the organizational change process. In this study, openness toward organizational change functioned as the mediating variable between dispositions and change outcomes. The results showed that those with an internal perception of control were more open to the organizational change process, which, in turn, was predictive of outcome variables including job satisfaction, work-related irritation, and turnover intentions.
In sum, although some studies have examined how dispositional variables impact training, only a small number have included locus of control. This research has typically shown that those with an internal locus of control also have higher motivation to learn during training (Colquitt et al., 2000). However, no research to date has examined whether locus of control functions as a resiliency variable in the training process as it appears to do in numerous other situations, and little, if any, research has studied the effects of locus of control in a computerized training environment where dispositional variables likely exert a stronger influence on the training process.

As previously discussed, employee training and development can be seen as a form of organizational change (O’Hara & Sayers, 1996). And like organizational change more broadly discussed, the employee training process can also be a stressful occurrence depending on the type of feedback trainees receive about their performance. More specifically, those trainees who perform well in early stages of training should have an increased sense of competence and believe that they can successfully complete a training program. For these trainees, an internal locus of control should still have a positive impact on their motivation and effort in later training modules (Colquitt et al., 2000). However, for trainees who perform poorly during training and thus receive negative feedback, their internal disposition could play a greater role in determining how motivated they will be to learn material in future training sessions. In this case, trainees with an internal locus of control may be better equipped psychologically to deal with this stress in training, as they would likely believe exerting more effort can lead to success. Those with an external sense, however, may disengage because they would believe that they have little control over future training performance.
H4a: Locus of control will be positively related to training process variables (motivation to learn, time on task, and task effort).

H4b: The relationship between locus of control and training process variables (motivation to learn, time on task, and task effort) will be moderated by the type of feedback received (positive/negative) such that the relationship will be stronger in the negative feedback condition (see Figure 6).

H4c: Process variables (motivation to learn, time on task, and task effort) will mediate the relationship between optimism and training performance.

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**Figure 6:**

Proposed Locus of Control Interaction Effect

**Computer Anxiety**

Computer anxiety may interfere with learning or limit the acceptance of computerized training (Kruse & Keil, 2000). Harrison and Rainer (1992) defined computer anxiety as a negative response to the anticipation of an interaction with a computer. As a result of computer anxiety, learners in computer-based training situations may avoid computers or make more errors (Maurer & Simonson, 1984; Paxton & Turner,
Additionally, research has shown that computer anxiety impacts course performance and database learning and has led to negative attitudes toward computers (Brosnan, 1998; Igbaria & Parasuraman, 1989; Marcoulides, 1988). Although a lack of computer experience is a common correlate of higher computer anxiety (O’Connell, Doverspike, Gilliken, & Mellon, 2001), exposure to computers can sometimes exacerbate individuals’ anxiety versus relieving it (Rosen, Sears, & Weil, 1993). Generally, however, more exposure to computers leads to a reduction in anxiety about their use, and given that people increasingly use computers at younger ages, computer anxiety will likely diminish in the future. Considering the effect computer anxiety can have on learners in a computerized environment, it is important to control for its effects. Therefore, computer anxiety will be measured and controlled for as a covariate in the present study.

Cognitive Ability

Cognitive ability (or general mental ability) has traditionally been found to be the strongest predictor of job performance (Hunter & Schmidt, 1996; Schmidt & Hunter, 1998). Research has demonstrated that validity coefficients vary based on job complexity (ranging from .23 for unskilled jobs to .58 for professional and managerial jobs), but that overall general mental ability predicts overall job performance above and beyond most other selection devices (including integrity tests, conscientiousness, structured and unstructured interviews, job knowledge tests, etc.) (Schmidt & Hunter, 1998).

In addition to its relation with overall job performance, research has shown that cognitive ability is also a strong indicator of both the acquisition of job knowledge on the job (Schmidt & Hunter, 1992) and of training program performance (Hunter, 1986;
Hunter & Hunter, 1984; Ree & Earles, 1991). For example, Ree and Earles studied how well general ability predicted job training performance among Air Force enlistees across 82 jobs. In general, the results demonstrated that cognitive ability was a strong predictor of performance in training across the various jobs, and that specific abilities added little predictive power beyond that of general ability. Given the importance of ability as a predictor of training performance, researchers have recommended controlling for its effects when examining the influence of other psychological constructs on performance (Byrnes, 1995; Holladay & Quinones, 2003). Therefore, a measure of general cognitive ability, the Wonderlic Personnel Test (Wonderlic, 2002), will be used to control for the impact of ability on performance. This should help provide a cleaner picture of which variables impact a trainee’s persistence in a multistage training program.

Summary of Hypotheses

In sum, two lines of research support the study of the impact of individual difference variables in a multistage computer-based training situation where trainees perform poorly in early stages of training. First, training literature has generallysupported a process model of training where more distal variables (personality, job/career) impact training process variables (motivation to learn) that subsequently affect training outcomes (knowledge acquisition, transfer, job performance) (Colquitt et al., 2000; Noe & Schmitt, 1986). However, as previously discussed, little research tested this model in a computer-based training situation. The organizational change literature provides insight as to which individual difference variables will likely be important and why. This literature demonstrates that when employees are confronted with a stressful situation such as organizational change, a number of individual difference factors serve
as a buffer to the change (Judge et al., 1999; Wanberg & Banas, 2000). Similar to the
training process model, more distal individual differences variables (self efficacy,
optimism, etc.) impact organizational change process variables (coping with change,
acceptance of change, etc.) that subsequently affect change outcome variables (job
satisfaction, organizational commitment, etc.). Based on these two lines of research, the
current study hypothesizes the following (see Figure 7).

H1a: Generalized self-efficacy will be positively related to training process
variables (motivation to learn, time on task, and task effort).

H1b: The relationship between generalized self-efficacy and training process
variables (motivation to learn, time on task, and task effort) will be
moderated by the type of feedback received (positive/negative), such that
the relationship is stronger in the negative feedback condition.

H1c: Process variables (motivation to learn, time on task, task effort) mediate
the relationship between generalized self-efficacy and training
performance.

H1d: Generalized self-efficacy will predict training process variables
(motivation to learn, time on task, and task effort) above and beyond a
task-specific measure of self-efficacy.

H2a: Mastery orientation will be positively related to motivation to learn, time
on task, and task effort in both the positive and negative feedback
conditions.

H2b: The relationship between performance approach orientation and training
process variables (motivation to learn, time on task, and task effort) will
be moderated by the type of feedback received, such that the relationship
will be positive in the positive feedback condition and negative in the
negative feedback condition.

H2c: The relationship between performance avoidance orientation and training
process variables (motivation to learn, time on task, and task effort) will
be moderated by the type of feedback received, such that the relationship
will be stronger in the negative feedback condition.
H2d:  Process variables (motivation to learn, time on task, and task effort) will mediate the relationship between goal orientation (learning and performance) and training performance.

H3a:  Optimism will be positively related to training process variables (motivation to learn, time on task, and task effort).

H3b:  The relationship between optimism and training process variables (motivation to learn, time on task, and task effort) will be moderated by the type of feedback received (positive/negative), such that the relationship will be stronger in the negative feedback condition.

H3c:  Process variables (motivation to learn, time on task, and task effort) will mediate the relationship between optimism and training performance.

H4a:  Locus of control will be positively related to training process variables (motivation to learn, time on task, and task effort).

H4b:  The relationship between locus of control and training process variables (motivation to learn, time on task, and task effort) will be moderated by the type of feedback received (positive/negative) such that the relationship will be stronger in the negative feedback condition.

H4c:  Process variables (motivation to learn, time on task, and task effort) will mediate the relationship between optimism and training performance.

Exploratory Hypotheses

EH1:  The strength of the relationships between goal orientation and training process variables (motivation to learn, time on task, and task effort) will vary such that in the positive feedback condition, mastery orientation will demonstrate the strongest positive relationship, performance approach the second strongest, and performance avoid the weakest.

EH2:  The strength of the relationships between goal orientation and training process variables (motivation to learn, time on task, and task effort) will vary such that in the negative feedback condition, mastery orientation will demonstrate a strong positive relationship, performance avoid a strong negative relationship, and performance approach a moderate negative relationship.
Training Reliance Variables
- Generalized Self-Efficacy
- Learning Orientation
- Locus of Control
- Optimism

Training Process Variables
- Motivation to Learn
- Mental Effort
- Time on Task

Training Performance Adjusted For Control Variables
- Cognitive Ability
- Computer Anxiety

Feedback Condition
- Positive
- Negative

Step 1:
Control Variables
- Cognitive Ability
- Computer Anxiety

Training Performance

Step 2:
Training Reliance Variables

Figure 7:
Hypothesized Model
CHAPTER III

METHODOLOGY

Participants

A sample of 197 undergraduates from the research pool of a large Midwestern university participated in this study. All participants were currently enrolled in various undergraduate psychology courses ranging from Introduction to Psychology to upper-level elective courses. Participants were randomly assigned to one of the two experimental conditions (positive/negative feedback) and were awarded extra credit points toward their psychology course grade. As described in the results section, 37 of the participants were excluded from the analysis. Excluding these participants in the final sample resulted in 57 males and 103 females, with a total of 160 participants. Participants had an average age of 19.98 years. Fifty-eight percent of the participants reported being freshmen in college, while 15.6%, 13.8%, 10%, and 2.5% reported being sophomores, juniors, seniors, and other respectively. Of the 160 participants, the majority indicated they were Caucasian (88.1%), while smaller percentages of participants indicated they were African American (6.9%), Asian (1.9%), Hispanic (1.6%), and other (1.9%).

Task

Two professional CD-ROM training modules, provided by a local consulting firm, were adapted for experimental purposes. The training modules presented
information about ambulance features and operations. These modules were chosen based on their professional use in the past as well as for the nature of the information presented. First, ambulance driving is a specialized skill that few participants were likely to have had experience with. Also, pilot study data indicated that the information was relatively interesting and thus should hold the attention of participants. The information presented in the training modules also offered participants practical information regarding driving that they may have found useful. Finally, the information presented provided a level of difficulty appropriate to this study. The training material was complex enough so that difficult performance questions could be written in order to provide believable negative feedback, while at the same time not being so difficult that participants would not believe positive feedback.

The training modules contained a number of different topic areas for participants to learn. Topics were organized hierarchically, so that participants began at the top of the hierarchy under the most general heading and worked their way down through subtopics within each major area. For example, participants could select the maneuvers topic, which would present a brief overview video about maneuvering the ambulance and then give learners options to obtain more detailed information about how to make particular maneuvers such as turns, backing up, etc. Participants were free to review previously seen material and were able to navigate the training program using buttons provided on the screen. The information presented included pictures, text, and short video clips. Headphones were required since information was presented in audio format. Once participants completed each of the available components within the training modules at least once, the performance test became available.
Procedure

Upon arriving, participants entered a computer lab and were seated in front of a computer. Participants first read a brief description of the study on the informed consent sheet and then signed the informed consent, indicating that they understood the purpose of the study and freely volunteered to participate. Next, the researcher provided the participant with a brief overview of the procedures in the study and then asked participants if they had questions before proceeding. At this point, participants read the welcome screen on the computer monitor and then proceeded through the various stages of the study.

The first task participants completed was the Wonderlic Personnel Test, which was administered online via the Wonderlic Web site. Following the Wonderlic, participants then completed questionnaires regarding the four training resilience variables (generalized self-efficacy, learning orientation, optimism, and locus of control) as well as a state training self-efficacy measure. After completion of these questionnaires, participants were asked to put on a set of headphones and follow instructions on the computer monitor. All instructions and experimental measures were presented via computer for purposes of consistency and ease of data collection.

Next, participants viewed a screen asking them to play the role of an ambulance driver trainee for American Medical Response (AMR). Participants were instructed that they needed to learn the training material before they began their new job as an ambulance driver, and that the information they would be learning was vital for their success on the job.
Before training commenced, participants viewed a technical instruction screen that provided information on how to navigate through the training program. Following this screen, participants began the first training session, which lasted approximately 25 minutes. After completing the first training session, participants’ performance was assessed via a 20-item multiple-choice test. After completing the test, participants were given the option of taking a five-minute break before proceeding. Once participants returned from their break, feedback about their performance on the test was given.

Participants were randomly assigned to one of two feedback conditions (positive/negative). Participants assigned the positive feedback condition were told that they performed very well on the first training module exam and that they passed the cutoff score of 80%. Participants in the negative feedback condition were told they did not pass the 80% cutoff and that they needed to try harder on the second module of training. One concern for administering feedback in an experimental design is that false feedback may not reflect the actual performance of the participant and, as such, the participant may not believe the feedback. Participants may have some sense of how they performed on the training performance test and thus not accept the feedback as accurate. A number of steps were taken to minimize and account for this possibility.

The test items for the first multiple choice test were developed and tested in a pilot study to assess the difficulty of the items. As such, items were selected based on their discrimination value in order to ensure that most people either truly pass or fail the first training performance exam. Participants in the pass condition took an exam consisting of 20 questions that the majority of pilot study participants scored an 80% or better on. Those assigned to the negative feedback condition took an exam based on
items that resulted in the majority of pilot study participants scoring well below the 80% cutoff point. This manipulation resulted in two performance tests with a core of 13 items shared by both tests, and 7 additional items used to shift the distribution of scores to a passing or failing range depending on the randomly assigned condition. Therefore, those participants in the pass (fail) condition did, in fact, pass (fail) the first exam, thus making the feedback more believable. Additionally, a scale measuring feedback accuracy (Keeping & Levy, 2000) measured whether the participants accepted the feedback as true.

At this point (after the receipt of feedback), all participants began the second training module, which also took approximately 25 minutes to complete. After participants completed the second training, they were asked to momentarily step outside of the training role to respond to two brief questionnaires about their motivation to learn and effort exerted to learn the training material in the second module. Motivation and effort were measured retrospectively as a way to minimize suspicions that the feedback may have been manipulated. Also, by having participants step out of their training role and informing them that part of the study was to assess the training module itself, it was expected that participants would likely be more honest regarding their motivational levels for learning the training.

Once participants completed the motivation and effort scales, their performance on the second training session was assessed with a 39-item multiple-choice questionnaire. Upon completion of the multiple-choice exam, participants then completed a brief set of questionnaires including computer anxiety, feedback acceptance, a manipulation check,
and demographics. Upon completion of the demographics, participants were debriefed and thanked for their participation.

Measures

Generalized Self-Efficacy Questionnaire. Generalized Self-Efficacy was measured using Schwarzer and Jerusalem’s (1995) 10-item scale. Respondents indicated the extent to which they agree with each of the items on a 5-point Likert-type scale, with 1 = (strongly disagree) and 5 = (strongly agree). Example items include “I can always manage to solve difficult problems if I try hard enough,” and “If I am in trouble, I can usually think of a solution” (see Appendix A for a complete list of the items).

Validity of the Generalized Self-Efficacy scale has been demonstrated in a number of studies. As previously discussed, Luszczynska, Scholz, and Schwarzer (2005) examined the validity of the generalized self-efficacy questionnaire in three countries and provided a summary of previous validity evidence. This study noted the positive relationships with constructs including global quality of life \( r = .24 \), active coping \( r = .27 \), planning, \( r = .33 \), intention to train/exercise \( r = .64 \), and negative relationships with variables including depressive symptoms \( r = -.39 \), tiredness \( r = -.36 \), and passive coping \( r = -.25 \). More specifically related to the current study, Chen, Gully, and Eden (2006) demonstrated that GSE predicted motivation \( r = .33 \) of students to learn course material in an upper-level psychology class. Finally, the GSE has shown acceptable reliability (ranging from .76 to .90) in samples from 23 countries (Tong & Song, 2004).

Locus of Control. Locus of control was measured with the 40-item Adult Nowicki-Strickland Internal-External Control Scale (ANS-IE) (Nowicki & Strickland, 1972; Nowicki & Duke, 1973). Respondents are presented statements and asked to
respond “Yes” or “No” to each. Example items ask “Do you feel that when good things happen, they happen because of hard work?” and “Do you feel that you have a lot of choice in deciding who your friends are?”

A number of studies have used the ANS-IE as a measure of locus of control. These studies have shown numerous relationships between locus of control as assessed by the ANS-IE and other constructs. For example, external locus of control has been correlated with trust \( (r = -.27) \) and autonomy \( (r = -21) \) (Hall, 2006), and stress \( (r = .44) \) and need for achievement \( (r = .41) \) (Hall, Spruill, & Webster, 2002), while an internal locus of control is linked to higher self-esteem \( (r = .44) \), health \( (r = .33) \), and well being \( (r = .15) \) (Furnham & Hughes, 1999).

Furthermore, research has shown that Rotter’s (1966) original I-E scale correlates highly with social desirability and has low face validity, and therefore may not provide the best measurement of locus of control. Alternatively, the ANS-IE correlated weakly with the Marlowe-Crowne Social Desirability Scale (ranging from \( r = .06 \) to \( r = .10 \)) and has demonstrated acceptable levels of reliability across a number of studies (split half ranging from .74-.86; test retest over a 6-week period of .83).

**Optimism.** The 10-item Life Orientation Test–Revised measured optimism (Scheier & Carver, 1992). Respondents indicated the extent to which they agree with each item on a 5-point Likert-type scale, with 1 = *(strongly disagree)* and 5 = *(strongly agree)*. Sample items include “I’m always optimistic about my future,” and “I rarely count on good things happening to me” (see Appendix C for the complete scale).

The validity of the LOT-R has been assessed either directly or indirectly in numerous studies. Scheier, Carver, and Bridges (1994) examined the factor structure of
the LOT-R based on three samples (2,055, 387, and 933 undergraduate students, respectively). The results of this exploratory factor analysis resulted in a single factor for all three samples, and in the sample of 2,055, the single optimism factor accounted for 48% of the variance and resulted in an average item loading of .69. Additionally, a confirmatory factor analysis with a single optimism factor yielded acceptable fit ($\chi^2 = 16.51, \Delta_1 = .99, \Delta_2 = .99, \text{RMR} = .012$).

Regarding predictive validity, optimism as measured by the LOT-R has been shown to predict 1) higher levels of natural killer cell cytotoxicity ($\beta = .27$), lower levels of depression ($\beta = -.63$), and reduced anger and depression ($\beta = -.35$) in prostate cancer patients (Pendo, Dahn, Kinsinger, Antoni, Molton, Gonzalez, et al., 2006); 2) higher levels of active coping ($r = .32$), lower levels of avoidant coping ($r = -.34$), and fewer depressive symptoms ($r = -.56$) in college students (Mosher, Prelow, Chen, & Yackel, 2006); and 3) higher acceptance of organizational change by employees ($\beta = .18$) (Wanberg & Banas, 2000). Finally, the coefficient alpha for the LOT-R ranged between .78 and .86 across these studies.

**Goal Orientation.** Goal orientation was measured using a 20-item dispositional learning orientation measure adapted from Elliot & Church (1997) and VandeWalle (1997) (See Appendix D). Seven items capture mastery orientation (e.g., “In general, I desire to completely master new skills”), six items assess performance-approach orientation (e.g., “I am motivated by the thought of outperforming others”), and seven items measure performance-avoid orientation (e.g. “In general, I just want to avoid doing poorly”). Respondents indicated the degree to which they agree with a given statement on a 5-point Likert-type scale with 1 = *(strongly disagree)* and 5 = *(strongly agree).*
Elliot and Church (1997) and VandeWalle (1997) provided initial construct validity in their foundational papers. Elliot and Church examined the factor structure of their measure as well as its relation to other constructs including achievement motivation, competence expectancy, fear of failure, intrinsic motivation, and graded task performance. The factor analysis data indicated that a three-factor solution (performance approach, mastery, and performance avoid) provided the best fit to the data with factors accounting for 63.3% of the total variance (33.1%, 18.2%, and 12%, respectively). Additionally, all items loaded above .40 on their respective factor, and the Chronbach’s alphas = .91, .89, and .77. Path analysis demonstrated expected relationships between study variables. For example, achievement motivation (β = .22) and competence expectancy (β = .34) predicted mastery goal orientation, which, in turn, predicted intrinsic motivation (β = .31). Similarly, fear of failure (β = .45) and competence expectancy (β = -.14) predicted performance avoidance orientation, which, in turn, was negatively related to intrinsic motivation (β = -.26) and graded performance (β = -.34).

VandeWalle (1997) also developed and validated, across a number of samples, a goal orientation scale aimed at assessing the construct in a work environment. Similar to Elliot and Church (1997), VandeWalle’s findings supported a three factor model (learning, prove, and avoid) via confirmatory factor analysis that compared three alternative models (a one-, two-, and three-factor model). The results revealed a strong fit for the three-factor model ($\chi^2 = 126.76$, CFI = .99, GFI = .98, $\chi^2/df$ ratio = 2.04) as well as acceptable levels of reliability (Chronbach’s α = .89 for Learning, .85 for Prove, and .88 for Avoid). Additionally, VandeWalle examined the relationships between goal orientation and implicit theories of intelligence, fear of negative evaluation, and feedback.
seeking. The results revealed relationships in the expected direction and add further support to the validity of the construct.

**Training Self-Efficacy.** Training self-efficacy was assessed using a 9-item Likert-type scale adapted from Chiaburu & Marinova (2005) and Schwarzer & Jerusalem (1995) (see Appendix E). Respondents indicated the extent to which they agree with each item on a 5-point Likert-type scale, with 1 = *(strongly disagree)* and 5 = *(strongly agree)*. A sample item from the scale states “In training for a job, I expect that I would do well.” Validity evidence for this measure has been well established in the training literature. Numerous studies have shown that training self-efficacy is predictive of trainee motivation and success (Colquitt et al., 2000; Noe & Schmitt, 1986; Noe & Wilk, 1993). Also, these studies have demonstrated acceptable scale reliabilities, with Chronbach’s alpha generally in the range of .80.

**Motivation to Learn.** Motivation to learn (Noe & Wilk, 1993; Weisbein, 2000) was measured by an 11-item motivation-to-learn scale (See Appendix F). This scale captures three components of motivation to learn, including desire, willingness, and confidence to succeed in a training program. Participants indicated the degree to which they agree with a given statement on a 5-point Likert-type scale, with 1 = *(strongly disagree)* and 5 = *(strongly agree)*. Sample items include “I will get more from this training than most people,” and “I am motivated to learn the skills emphasized in the training program.”

Given the generally changing nature of the motivation to learn scale due to its adaptation to various training situations, traditional factor analytic validity evidence is virtually nonexistent in the training literature. As such, predictive validity serves as the
primary validity source for the motivation to learn scale. A number of studies have examined the impact of motivation to learn on criteria including declarative knowledge, skill acquisition, post-training self-efficacy, transfer, and job performance. Colquitt et al.’s (2000) meta analysis provided a summarization of these studies that resulted in validity coefficients ranging from .22 to .45 for the criteria previously mentioned. Additionally, the motivation to learn scale has demonstrated acceptable internal consistency reliability coefficients in a number of studies (e.g., α = .88, Noe & Wilk, 1993; α = .93, Quinones, 1995).

Task-Specific Efficacy. Task-specific self-efficacy was assessed using two scales. The first was a 12-item Likert-type scale adapted from Chiaburu & Marinova (2005) and Schwarzer & Jerusalem (1995) (see Appendix G). Respondents indicated the extent to which they agree with each item on a 5-point Likert-type scale, with 1 = (strongly disagree) and 5 = (strongly agree). A sample item from the scale states “In training to be an ambulance driver, I could learn how to properly maneuver an ambulance.” Although no studies that the author is aware of have used a self-efficacy scale specific to ambulance operations, similar self-efficacy scales assessing different specific tasks have been developed under the same rubric and have demonstrated acceptable reliability and validity evidence (Colquitt et al., 2000; Noe & Schmitt, 1986; Noe & Wilk, 1993).

The second scale was a 6-item Likert-type scale adapted from Arthur, Bell, & Edwards, 2007 (see Appendix H). For this scale, respondents indicated the extent to which they agree with each item on a 5-point Likert-type scale, with 1 = (strongly disagree) and 5 = (strongly agree). A sample item from the scale states “I know I can achieve good scores in the ambulance driver training.” Both task-specific efficacy scales
were introduced halfway through data collection. Both scales were administered prior to the commencement of training. Additionally, the 6-item scale was administered a second time after trainees had completed the second training module and asked participants about their retrospective efficacy for completing the second stage of training.

*Task Effort.* Task effort (see Appendix 1) was measured by a five-item scale developed for this study. The original eight-item scale was pilot-tested on 80 undergraduates and resulted in two factors representing task effort and task difficulty. The five items measuring task effort were retained for use in the current study. A sample item states “I put a good deal of effort into learning the training material.” Respondents indicated the extent to which they agreed or disagreed with the items on a Likert-type scale ranging from 1 = (*strongly disagree*) to 5 = (*strongly agree*). Chronbach’s alpha for the piloted five-item scale was .80.

*Time Spent on Training Module.* The computer monitored time spent on each of the training modules. This gave an objective measure of how much time was spent learning the training material.

*Module 1 Training Performance.* A 20-item multiple choice performance test assessed participants’ time 1 training performance. Two versions of the test were developed to accommodate the study’s two-cell design (see Appendices J and K). Forty participants completed the module 1 training in a pilot study and were given a 47-item multiple choice exam. Item difficulty levels were calculated and 27 items were selected to develop two module 1 performance tests. Both tests consisted of 13 core items. However, seven items differed across the two tests, with the primary difference being the difficulty of these items. For those in the positive feedback condition, the difficulty of the
seven items was relatively easy, while the items for those in the negative feedback condition were fairly difficult. Chronbach’s alphas from the pilot data for the easy and difficult versions of the performance test are .63 and .50, respectively. Although these reliabilities are relatively low, the purpose of these tests is to provide believable feedback. Therefore, the reliability of these tests is less crucial to the study.

**Module 2 Training Performance.** A 38-item multiple choice performance test measured participants’ time 2 training performance. Performance was assessed by the number of correct responses on the multiple choice exams (see Appendix L). The performance measure was developed for use in this study and was piloted on 40 participants. These participants viewed the second training module and were then administered a 48-item performance test. After examining item difficulty and scale reliability, 38 items were retained for the current study. Chronbach’s alpha for these items for the pilot study data was .70.

**Feedback Accuracy.** A four-item scale adapted from Keeping & Levy (2000) assessed the accuracy of the feedback (see Appendix M). Participants indicate the degree to which they agree with a given statement on a 5-point Likert-type scale with 1 = *(strongly disagree)* and 5 = *(strongly agree)*. A sample item states “The feedback was an accurate evaluation of my performance.”

**Manipulation Check.** A four-item scale was developed for this study to ensure the success of the manipulation (see Appendix N). Participants indicated the degree to which they agree with a given statement on a 5-point Likert-type scale with 1 = *(strongly disagree)* and 5 = *(strongly agree)*. A sample item states “The feedback said that I passed the first training session.”
Wonderlic Personnel Test. The Wonderlic was used as a control measure for general cognitive ability. The test was administered via the Internet. Participants were given 12 minutes to respond to 50 items (see Appendix O). Each question was presented one at a time on the computer screen, and participants were not allowed to go back to previously answered items. Research has shown that this test provides an accurate and reliable measure of general cognitive ability (Byrnes, 1995; Holladay & Quinones, 2003; Wonderlic, 2002). For instance, the Wonderlic Personnel Test correlated .92 with the WAIS-R IQ test in several samples, .87 with the Otis-Lennon Mental Ability Test, and .74 with the General Aptitude Test Battery (Wonderlic, 2002). Additionally, research examined the predictive validity of the Wonderlic Personnel Test. This research demonstrated predictive validity coefficients ranging from .27 to .67 for criteria including supervisor ratings, training school exam scores, GPA from vocational training programs, and others (Wonderlic, 2002). Finally, the Wonderlic Personnel test has demonstrated acceptable reliability, including short-term test retest reliability coefficients ranging from .82 to .94, longitudinal reliability of .94, alternate forms reliability ranging from .73 to .95, and internal consistency reliability ranging from .88 to .94 (Wonderlic, 2002).

Computer Anxiety. The Computer Anxiety Scale (O’Connell, Doverspike, Gilliken, & Meloun, 2001) is a 12-item self-report measure (see Appendix P) that assessed a participant’s anxiety toward using a computer. Participants indicated the extent to which they agree with an item on a Likert-type scale ranging from 1 = (strongly disagree) to 5 = (agree). An example item is “I get a sinking feeling when trying to use a computer.”
O’Connell et al. (2001) provide validity evidence for the Computer Anxiety Scale. The purpose of this study was to develop a computer anxiety scale and examine its relation to various psychological constructs. Factor analysis of the computer anxiety scale items resulted in one factor best fitting the data, with items loading at .40 or higher. Relationships with other variables, including test performance ($r = -.43$), test anxiety ($r = .33$), and negative affectivity ($r = .35$), were moderate and in the expected direction. Coefficient alpha for this scale was .88.
<table>
<thead>
<tr>
<th>Construct</th>
<th>References</th>
<th>Validity Coefficient Ranges</th>
<th>Reliability Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generalized Self Efficacy</td>
<td>Chen, Gully, and Edin (2004), Luszczynska, Scholz, and Schwarzer (2005), Schwarzer and Jerusalem (1995), Tong and Song (2004)</td>
<td>r's = .24 to .64</td>
<td>α's = .76 to .90</td>
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<tr>
<td></td>
<td></td>
<td>r's = -.25 to -.39</td>
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<tr>
<td>Locus of Control</td>
<td>Nowicki &amp; Duke (1973), Hall (2006), Hall et al. (2002), Furnham &amp; Hughes, 1999</td>
<td>r's = .15 to .44</td>
<td>α's = .74 to .86</td>
</tr>
<tr>
<td></td>
<td></td>
<td>r's = -.21 to -.27</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>r's = -.35 to -.63</td>
<td></td>
</tr>
<tr>
<td>Goal Orientation</td>
<td>VandeWalle (1997), Elliot &amp; Church (1997), DeShon &amp; Gillespie (2006)</td>
<td>r's = .31 to .39</td>
<td>α = .89(^1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>r's = -.18 to -.25</td>
<td>α's = .85 to .91(^2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>r's = -.26 to -.34</td>
<td>α's = .77 to .88(^3)</td>
</tr>
<tr>
<td>General Mental Ability</td>
<td>Byrnes (1995), Holladay and Quinones (2003), Wonderland (2002)</td>
<td>r's = .27 to .67</td>
<td>α's = .88 to .94</td>
</tr>
<tr>
<td>Computer Anxiety</td>
<td>O’Connell, et al. (2001)</td>
<td>R's = .33, .35, and -.43</td>
<td>α's = .88</td>
</tr>
</tbody>
</table>

\(^1\) Mastery Orientation
\(^2\) Performance Approach Orientation
\(^3\) Performance Avoid Orientation
A pilot study was conducted prior to the primary study in order to develop the training module performance tests. A total of 95 items were developed based on the content of the two training modules. For the pilot study, 80 participants were recruited from the psychology department research pool at a large Midwestern university. Of the 80 participants, 40% were men and 60% were women, and the sample was 78.8% Caucasian, 11.3% African American, 6.3% other (primarily multi-racial), 2.5% Hispanic, and 1.3% Asian. The average age of the sample was 22.23 years ($SD = 7.37$) and the majority of the participants reported being freshmen (60%); however, all undergraduate levels were represented (18.8% sophomores, 13.8% juniors, 6.3% seniors, 1.3% others).

Half of the participants received the Basic Driving training module (training module 1) and were administered the 47-item multiple-choice test corresponding to this module, while the remaining participants received the Backing and Maneuvering training module (training module 2) and thus were administered the 48-item multiple-choice test corresponding to this module. The items for the Basic Driving module were developed specifically to include a number of difficult items for the purpose of manipulation in the primary study. The manipulation in the primary study involved randomly assigning participants to a positive or negative feedback condition, and in order to ensure
believability of the feedback, the final items for the Basic Driving Performance test were selected largely based on their difficulty level.

Based on the results of the pilot study, two 20-item tests were developed to assess performance in the Basic Driving module. Thirteen items were similar to both tests, but seven items differed for the purpose of manipulation. The first 20-item test was designed specifically for the positive feedback condition. As such, seven of the easiest test items were selected in order to ensure that the majority of participants in the positive feedback condition actually passed the established cutoff point for passing the training. Similarly, the second 20-item test developed for the negative feedback condition included seven very difficult items in order to ensure that the majority of participants in the negative feedback condition actually failed to reach the minimum cutoff score on the test.

Of the 48 items developed for the Backing and Maneuvering performance test, 38 items were retained for the main study. The average score on the original 48 items was $M = 34.48$ ($sd = 4.09$), and the average score on the final 38 item test was $28.73$ ($sd = 4.32$), indicating good variability in scores. The coefficient alpha of the 38-item test was .71.

In sum, based on the results of the pilot study, three multiple-choice tests were developed for the primary study. Two 20-item tests were developed for the purpose of manipulation, with the two tests having 13 similar items and 7 different items in order to alter the difficulty of the tests. Also, one 38-item test was developed to assess the performance of trainees in the Backing and Maneuvering training module.
Manipulation Check

For the primary study, data were collected from 197 participants. Participants were recruited from a number of undergraduate psychology courses at a large Midwestern university, ranging in course level from introduction to psychology to higher-level elective courses. Participants reported to the lab at a predetermined date and time and were randomly assigned to either the positive or negative feedback condition. This resulted in 103 participants in the positive feedback condition, and 94 in the negative feedback condition.

Data were first examined to identify those participants who failed to meet the requirements of the assigned condition. For example, a participant assigned to the positive feedback condition (and, therefore, told they passed the first performance test) may have in actuality failed the first performance test, and thus received incorrect feedback. Similarly, those participants in the negative feedback condition (told they failed the first performance test) may have actually passed the first test, and thus received incorrect feedback. Receiving incorrect feedback is a threat to the internal validity of the study as those in the negative (positive) feedback condition who actually passed (failed) the performance test may not have believed the feedback, and thus their response to the feedback may confound the results. It is critical for this study that participants perceptions of their own performance and the feedback they were given align so that the resulting conclusions regarding the linkages between individual difference variables and motivation and performance are as free from error as possible.

After scoring the first training module performance tests, 21 participants in the positive feedback condition were identified that failed the performance test and 9
participants in the negative feedback condition were identified that passed the performance test. A series of t-tests were performed to examine the difference in feedback acceptance and the manipulation check variables for between the groups receiving correct and incorrect feedback. It was found that for those participants in the negative feedback condition, those who received negative feedback, but actually passed the performance test, accepted the feedback given ($M = 2.44$) significantly less than those in the negative feedback condition that actually failed ($M = 3.00$) ($t = 1.98, p < .05$). While this was the only significant differences found, given the nature of the study and the risk for error, all misaligned participants in terms of the feedback they received and their actual test performance were dropped from the study. This resulted in 30 participants being dropped from further analyses, along with two additional participants who reported not reading the feedback. Removing these participants resulted in 165 usable cases, 81 in the positive and 84 in the negative feedback conditions, respectively.

Next, the manipulation check items were examined to ensure that the remaining sample received the correct feedback. The manipulation check consisted of four Likert-type items and asked participants to indicate how strongly they agreed with statements about the feedback they received. A t-test examined whether there were significant differences between the two groups in response to the manipulation check items. The results indicated that the two groups did differ ($t = 38.44, p > .01$), such that those in the positive feedback agreed that they received positive feedback and those in the negative condition disagreed that they received positive feedback.

Additional information from the primary study supported the results of the manipulation check. After the study had commenced, a six-item task-specific self-
efficacy scale was added to the study at two different points in the procedure, both prior to and following the feedback. Examining these data revealed that, for the 35 participants who completed this measure in the positive condition, efficacy significantly increased from $M = 3.57$ at time 1 to $M = 3.85$ at time 2 ($t = 3.47, p > .01$), and, conversely, the self-efficacy of the 35 participants in the negative condition decreased from $M = 3.85$ at time 1 to $M = 3.43$ at time 2 ($t = 5.41, p > .01$). Based on the results of the manipulation check items and self-efficacy items, it appears that the manipulation was successful.

Decisions about the Data

Following Kline’s (1998) rules regarding univariate normality, each item from each scale was examined for skewness and kurtosis. Kline states that a scale item with skewness values greater than or equal to 3.0 or kurtosis values greater than or equal to 10.00 may be problematic and should be considered for removal. Results of the descriptive statistics for items in all scales revealed no violations of Kline’s criteria. Therefore, the assumption of univariate normality was satisfied and all data were retained for further analysis.

Two criteria were used to assess the multivariate normality of the data. First, Cohen, Cohen, West, and Aiken (2003) recommend examining the studentized deleted residuals of primary study variables. The value of the studentized residual is an index of discrepancy or distance between observed and predicted values of the dependent variable for each case. The recommended cutoff value for studentized residuals is 2.0, as about 5% of cases will likely fall above this point for smaller sample sizes (under 1000). As such, the focal dependant variable, training module 2 performance, was regressed on the primary study variables (Wonderlic score, computer anxiety, generalized self-efficacy,
locus of control, optimism, mastery orientation, performance approach orientation, performance avoid orientation, motivation to learn, task effort, and time on training module 2) and studentized residuals were calculated. Upon examining the residual values, none of the residuals exceeded the 2.0 cutoff and, thus, all data were retained for further analysis.

Tabachnick and Fidell (2007) also recommend examining the Mahalanobis distance of each case as a check for multivariate outliers. The value of the Mahalanobis distance represents the distance of an individual case’s standing on the independent variables from the centroid (center point of all independent variables) of the remaining cases. To examine the Mahalanobis distances for each case, the focal dependent variable—training module 2 performance—was regressed on the primary study variables (Wonderlic score, computer anxiety, generalized self-efficacy, locus of control, optimism, mastery orientation, performance approach orientation, performance avoid orientation, motivation to learn, task effort, and time on training module 2), and Mahalanobis distances were calculated for each case. These values conform to a chi-square distribution and, as such, can be tested for significance. Tabachnick and Fidell recommend a conservative alpha level of .001 for this test. Following their recommendations, five cases were identified as having significant Mahalanobis distances and, therefore, were removed from the data set. This resulted in a final sample of 160 participants split evenly across the positive and negative feedback conditions.
Demographics

Of the 160 participants, 103 (64.4%) were female and 57 (35.6%) were male. The average age of participants was $M = 20.00$ ($sd = 3.27$) with the majority of participants (84.4%) ranging between 18 and 22 years of age. Regarding ethnicity, 141 (88.1%) of participants reported being Caucasian, 11 (6.9%) African American, 3 (1.9%) Asian, 2 (1.3%) Hispanic, and 3 (1.9%) as Multiracial or other. The majority of the participants (91.9%) reported being full-time students, and most of these were freshmen ($n = 93, 58.1$%); however, all undergraduate class levels were represented: 25 sophomores (15.6%), 22 juniors (13.8%), 16 seniors (10%), and 4 others (2.5%) (see Table 2 for demographics by experimental condition).

Scale Reliabilities

Internal consistency reliability (Chronbach’s alpha) was computed for the various measures used in the main study (see Table 3). The alpha levels for the four primary independent variables—generalized self-efficacy ($\alpha = .78$), optimism ($\alpha = .80$), locus of control ($\alpha = .71$), and learning orientation (mastery $\alpha = .87$, approach $\alpha = .77$, avoid $\alpha = .82$)—all exceeded .70, thus demonstrating acceptable levels of internal consistency reliability. Regarding the mediating variables (motivation to learn $\alpha = .86$, task effort $\alpha = .88$, and time on task $\alpha = not applicable$) and dependent variable (training module 2 performance $\alpha = .70$), again all alpha coefficients demonstrated acceptable levels of scale reliability. In addition to the primary study variables, reliabilities for the control variables (computer anxiety $\alpha = .92$, Wonderlic $\alpha = not available^2$), task-specific self-efficacy

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$^2$Wonderlic Inc. only provided the total scores for each participant and, as a result, reliability of the Wonderlic for the sample studied could not be calculated.
scales, (training self-efficacy $\alpha = .81$, task-specific self-efficacy $\alpha = .94$, Arthur task-specific self-efficacy time 1 $\alpha = .90$, Arthur task-specific self-efficacy time 2 $\alpha = .90$), manipulation check items ($\alpha = .97$), and feedback accuracy ($\alpha = .90$) were calculated. Again, the results show that all scales have reliability above the generally accepted cutoff point of .70. Overall, the scales used in the primary study demonstrated good levels of reliability.

Table 2

<table>
<thead>
<tr>
<th>Demographic Characteristics across Conditions</th>
<th>Positive Feedback</th>
<th>Negative Feedback</th>
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<tbody>
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<tr>
<td>Age</td>
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<tr>
<td>$&gt; 18$</td>
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<td>$18-20$</td>
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<td>$21-23$</td>
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<td>20.1%</td>
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<td>$24-26$</td>
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<td>$27 +$</td>
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<tr>
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<tr>
<td>Male</td>
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*Note: n = 80 in both conditions*
Table 3

Reliability of Scales

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<td>Independent Variables</td>
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<td>Generalized Self-Efficacy</td>
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Note: NA = Not Available

Descriptive Statistics and Correlations

The goal of the current study was to examine trainee resilience in a computer-based multi-staged training context. The researcher proposed that four individual difference variables (generalized self-efficacy, optimism, learning goal orientation, and
locus of control) would function as buffers to negative information about training performance. More specifically, the hypothesized effect of the resilience variables was couched within Colquitt et al.’s (2000) training model. This training model is a process or mediational model, such that the effect of individual difference characteristics on training performance is mediated by factors that are central to the training process (motivation to learn, time on task, etc.). The current study proposed that many of the relationships in the training process model would vary as a combined function of the feedback one receives (positive/negative) and one’s standing on resilience variables. As such, the design of the current study includes both mediation (training processes) and moderation (positive/negative feedback) and, therefore, tests the primary hypothesis that resilience variables generally demonstrate stronger relationships in the negative feedback condition. Means, standard deviations, and correlations for the primary study variables are presented for the entire sample in Table 4. Further, Table 5, Table 6, and Table 7 provide descriptive statistics by condition and the results of significance tests for mean differences across conditions.

Several important relationships can be seen in Tables 4-6. First, regarding the independent variables, it can be seen in the full sample and in the two experimental conditions that these variables in general were related to each other. In the full sample, generalized self-efficacy was significantly positively related to optimism ($r = .24, p < .01$), mastery orientation ($r = .24, p < .01$), locus of control ($r = .28, p < .01$), and training self-efficacy ($r = .51, p < .01$), and was significantly negatively correlated with performance avoid orientation ($r = -.19, p < .05$).
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Note: Time on Training = number of minutes spent in the second training module. Training Performance = performance on the second training module test. All scale scores range from 1-5 except the Wonderlic (0-50), Locus of Control (0-41), and Training Performance (0-38). Higher scores on Locus of Control indicate an internal locus of control.

* p < .05, ** p < .01
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*Note: Time on Training = number of minutes spent in the second training module. Training Performance = performance on the second training module test. All scale scores range from 1-5 except the Wonderlic (0-50), Locus of Control (0-41), and Training Performance (0-38). Higher scores on Locus of Control indicate an internal locus of control.

* p < .05, ** p < .01
| Table 6 |
|----------------|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Variable       | M    | SD    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   |
| Wonderlic      | 23.24 | 5.68  | -    |      |      |      |      |      |      |      |      |      |      |      |
| Computer Anxiety| 2.02  | .63   | .01  |      |      |      |      |      |      |      |      |      |      |      |
| Generalized Self-Efficacy | 3.86  | .42   | .05  | -.28*|      |      |      |      |      |      |      |      |      |      |
| Optimism       | 3.51  | .60   | .08  | .21  | .25* |      |      |      |      |      |      |      |      |      |
| Mastery Orientation | 4.01  | .51   | .03  | -.28*| .59**| .30**|      |      |      |      |      |      |      |      |
| Performance Approach | 3.39  | .72   | .09  | .09  | .06  | .00  | .04  |      |      |      |      |      |      |      |
| Performance Avoid | 2.84  | .67   | .15  | .27* | -.18 | -.24**| -.29**| .34**|      |      |      |      |      |      |
| Locus of Control | 29.76 | 4.98  | .16  | -.24*| .39**| .34**| .28**| -.21 | -.26*|      |      |      |      |      |
| Training Self-Efficacy | 3.89  | .38   | -.09 | -.32**| .49**| .37**| .52**| .14  | -.27*| .41**|      |      |      |      |
| Motivation to Learn | 3.58  | .44   | -.08 | -.10 | .03  | .10  | .07  | .05  | .09  | -.19 | .05  |      |      |      |
| Task Effort    | 3.55  | .60   | -.08 | .00  | .06  | .07  | .14  | -.08 | -.04 | -.24*| .00  | .76**|      |      |
| Time on Training | 28.97 | 3.47  | .20  | .12  | -.21 | -.02 | -.14 | -.01 | .24* | -.04 | -.25*| .30**| .26* |      |
| Training Performance | 28.89 | 3.89  | .38**| -.12 | -.20 | .08  | .09  | -.02 | -.02 | -.03 | -.16 | .16  | .17  | .40**|

**Note:** Time on Training = number of minutes spent in the second training module. Training Performance = performance on the second training module test. All scale scores range from 1-5 except the Wonderlic (0-50), Locus of Control (0-41), and Training Performance (0-38). Higher scores on Locus of Control indicate an internal locus of control.

* p < .05, ** p < .01
A similar pattern of relationships was found for generalized self efficacy in the positive and negative feedback conditions, with the exception of the non-significant relationships with performance avoid orientation in both the positive \((r = -.19, p > .05)\) and negative \((r = -.18, p > .05)\) feedback condition, which was likely due to the reduction in power because of the sample size decrease.

The relationship between optimism and the other independent variables mirrored those of generalized self efficacy. In the full sample, optimism was significantly positively correlated with generalized self-efficacy \((r = .24, p < .01)\), mastery orientation \((r = .30, p < .01)\), locus of control \((r = .34, p < .01)\), and training self-efficacy \((r = .37, p < .01)\), and was significantly negatively correlated with performance avoid orientation \((r = -.24, p < .01)\). A similar pattern of relationships was found for optimism in the positive and negative feedback conditions.

Locus of control demonstrated a similar pattern of relationships to the other independent variables. In the full sample, locus of control was significantly positively related to generalized self-efficacy \((r = .28, p < .01)\), optimism \((r = .34, p < .01)\), mastery orientation \((r = .21, p < .01)\), and training self-efficacy \((r = .27, p < .01)\), and was significantly negatively correlated with performance approach \((r = -.21, p < .01)\) and performance avoid orientation \((r = -.25, p < .01)\). A few notable differences were seen in the experimental conditions. First, in the positive condition, the relationships between locus of control and mastery orientation \((r = .13, p > .05)\) and performance approach orientation \((r = -.20, p > .05)\) were not significant. However, in the negative feedback condition, locus of control was significantly positively related to mastery orientation \((r = .28, p < .01)\).
In general, performance approach and performance avoid orientation were either unrelated or were negatively related to the other independent variables. Given their conceptual meaning, this finding was expected, as these two components of learning orientation do not generally fit with the idea of resilience. Most notable were their relationships with each other and with mastery orientation. Performance approach orientation was not significantly related to mastery orientation in the full sample ($r = .05, p > .05$), the positive feedback condition ($r = .21, p < .01$), and the negative feedback condition ($r = .21, p < .01$). Performance avoid orientation, however, was significantly negatively related to mastery orientation in the full sample ($r = -.29, p < .01$), the positive feedback condition ($r = -.29, p < .01$), and negative feedback condition ($r = -.29, p < .01$), while also being significantly positively related to performance approach orientation in the full sample ($r = .50, p < .01$), positive ($r = .46, p < .01$), and negative ($r = .54, p < .01$) feedback conditions.

Next, the relationships between the training process variables (motivation to learn, task effort, and time on task) were examined along with their relationships to the independent and dependent variables. As seen in Table 4, there were a number of significant relationships among the training process variables. First, in the full sample, those indicating higher levels of motivation to learn the training material also reported significantly higher levels of task effort ($r = .78, p < .01$) and spent a significantly longer time on the training task ($r = .28, p < .01$). Examining these relationships in the experimental conditions, one difference emerged. In the positive condition, task effort was not significantly related to time spent on the training task ($r = .20, p > .05$) (although this is likely due to reduced power). The pattern of relationships among the training
process variables in the negative feedback condition virtually mirrored those of the full sample.

Regarding the relationships between the training process variables and the independent variables, only a few significant bivariate relationships emerged. In the full sample, those higher in motivation to learn the training material also had higher levels of generalized self-efficacy \((r = .19, p < .05)\), mastery orientation \((r = .17, p < .05)\), and training self-efficacy \((r = .17, p < .05)\). Additionally, participants having higher levels of task effort also reported higher levels of mastery orientation \((r = .19, p < .05)\) and tended to have an external locus of control \((r = -.20, p < .01)\). Also in the full sample, those spending more time on the training reported lower, less generalized self-efficacy \((r = -.16, p < .05)\) but were more likely to adopt a performance approach learning orientation \((r = .17, p < .05)\).

In the positive feedback condition, motivation to learn was significantly related to generalized self-efficacy \((r = .32, p < .05)\) and mastery orientation \((r = .24, p < .05)\). Additionally, locus of control was significantly negatively correlated with time on training \((r = -.24, p < .05)\), indicating that those with an external locus of control spent a longer time in the training module. Interestingly, task effort was not significantly related to any of the independent variables in the positive feedback condition.

As seen in Table 6, in the negative feedback condition, motivation to learn was not significantly related to any of the independent variables. Also, task effort was significantly negatively correlated with locus of control \((r = -.24, p < .05)\) in the negative feedback condition indicating that extraverted individuals reported higher levels of task effort. Regarding time spent on the task, only one significant relationship emerged;
trainees with a performance avoid learning orientation spent more time on the training task \((r = .24, p < .05)\).

A number of relationships with the dependent variable, training performance, were noteworthy. First, training performance was significantly correlated with intelligence in the full sample \((r = .49, p < .01)\) and in both the positive \((r = .56, p < .05)\) and negative \((r = .43, p < .05)\) feedback conditions. In all cases, higher levels of intelligence were related to higher performance on the training performance exam. Next, in looking at the relationships between training performance and the independent variables, one can see in the full sample that none of the independent variables were significantly correlated with training performance. However, examining these relationships by experimental condition revealed slightly different results. In the positive feedback condition, trainees higher in performance avoid learning orientation tended to score lower on the training performance test \((r = -.28, p < .05)\), and with an internal locus of control tended to score higher on the performance test \((r = .30, p < .05)\). However, in the negative feedback condition, none of the independent variables significantly correlated with performance on the training performance test. Regarding the correlations between the training process variables and training performance, as seen in Tables 4-6, motivation to learn, task effort, and time on task were not significantly related to training performance in either the full sample or the two experimental conditions.

Examination of the control variables, intelligence (Wonderlic) and computer anxiety, revealed a number of significant relationships. First, as previously mentioned, intelligence was highly positively related to training performance \((r = .49, p < .01)\). Additionally, intelligence was negatively related to computer anxiety in the positive
feedback condition \(r = -.30, p < .05\), but this relationship was non-significant in the negative feedback condition \(r = .01, p < .05\). Computer anxiety was significantly correlated with a number of variables. In the full sample, those reporting higher levels of computer anxiety tended to report lower levels of generalized self-efficacy \(r = -.26, p < .01\), mastery orientation \(r = -.20, p < .05\), training self-efficacy \(r = -.24, p < .01\) and also were more likely to have an external locus of control \(r = -.20, p < .05\). In examining these relationships within experimental condition, a similar pattern is found in that computer anxiety was significantly related to generalized self efficacy \(r = -.28, p < .05\), mastery orientation \(r = -.28, p < .05\), and performance avoid orientation \(r = .27, p < .01\). The relationship between computer anxiety and generalized efficacy \(r = -.26, p < .05\) was the only significant in the positive feedback condition between computer anxiety and the other study variables.

Finally, a number of t-tests were performed to look for significant mean level differences by experimental condition. As seen in Table 7, only two significant differences between the experimental groups were found. First, those trainees in the negative feedback condition reported significantly higher task-specific self-efficacy \(t = 2.07, p < .05\). This indicates that before beginning the training modules, trainees in the negative condition had higher levels of efficacy than did the trainees in the positive condition. Also, the results of the t-tests showed a significant difference between the experimental groups for the manipulation check items. As expected, those in the positive feedback condition reported that they received positive feedback significantly more than those trainees in the negative feedback condition \(t = 38.44, p < .01\).
**Analysis Strategy**

A number of statistical analyses were available to analyze the data in the current study. The design of the study was experimental, where participants were randomly assigned to one of two experimental groups (positive/negative feedback). Additionally, the study included a number of latent constructs that were hypothesized to impact other latent and measured variables. Third, the study design included both moderating and mediating effects among the studied variables. Given these study parameters, a subgroup latent path analysis provided the most appropriate test of the hypotheses. When using structural equation modeling with latent variables, it is appropriate to first examine the measurement component of the model (i.e., factor structure of latent variables).

### Table 7

*Descriptive Statistics with T-Tests by Condition*

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*Note:* WOND = Wonderlic, CANX = Computer Anxiety, GSE = Generalized Self-Efficacy, OPT = Optimism, LOC = Locus of Control, MO = Mastery Orientation, PARP = Performance Approach Orientation, PAVD = Performance Avoid Orientation, TSE = Training Self-Efficacy, MOT = Motivation to Learn, TASEF = Task Effort, TIME2 = Time in Minutes Spent in Training Module 2, PERF = Performance on Training Test, MANIP = Manipulation Check. The Wonderlic score ranges from 0–52. The Locus of Control Scale ranges from 0–40 and is scored such that a higher score indicates an internal locus of control. The training performance test ranged in score from 0–38.

* p < .05, ** p < .01
Therefore, a series of confirmatory factor analysis were conducted to verify the factor structure of the latent variables in this study.

The general process for these confirmatory factor analyses was to 1) verify the structure of the latent factors in the full sample, and 2) test for measurement invariance across the experimental groups. Measurement invariance exists when the latent structure for variables is similar across groups (Vandenberg & Lance, 2000). Invariance is generally tested by comparing a constrained factor model, where factor loadings are held equal across groups, to a model where factor loadings are estimated freely across the groups. A non-significant increase in chi-square between the two models provides evidence for measurement. The following sections discuss the results of the measurement invariance analyses for each of the latent variables in the current study.

**Generalized Self-Efficacy**

A confirmatory factor analysis verified the unidimensionality of generalized self-efficacy on the full sample. The specified model included a single factor with all 12 items loading on that factor (see Figure 8). The results of the analysis indicated the single-factor model fit reasonably well ($\Delta \chi^2_{(33)} = 82.26, p < .001$, CFI = .87, TLI = .83, RMSEA = .10, SRMS = .07) and that all items loaded significantly on the single factor. Next, measurement invariance was tested by examining the change in chi-square values between the constrained (equal factor loadings across groups) and freely estimated models. The results of the analyses showed that the fit of the constrained model ($\chi^2_{(75)} = 124.68, p < .001$, CFI = .88, TLI = .85, RMSEA = .09, SRMS = .09) did not differ significantly ($\Delta \chi^2_{(9)} = 10.18, p > .05$) from the freely estimated model ($\chi^2_{(66)} = 114.50, p <$
.001, CFI = .88, TLI = .84, RMSEA = .10, SRMS = .08), thus providing support for measurement invariance across experimental conditions for generalized self-efficacy.

**Optimism**

A CFA analysis examined the factor structure of the optimism measure. Similar to generalized self-efficacy, the results verified the unidimensional structure of optimism. The model specified included a single factor with the six optimism items (see Figure 9) loading on the single factor. The results for this model indicated good fit ($\chi^2 (8) = 15.21, p > .05$, CFI = .98, TLI = .96, RMSEA = .08, SRMS = .04), and all items loaded significantly on the single factor.

Previous research has argued that a two-factor structure modeling optimism and pessimism as separate factors provides better fit than a single-factor model. As such, a two-factor model was compared to the single-factor model, and the results of this test show that the two-factor model ($\chi^2 (7) = 14.06, p > .05$, CFI = .98, TLI = .95, RMSEA = .08, SRMS = .04) did not fit the data better ($\Delta \chi^2 (1) = 1.15, p > .05$) than the more parsimonious and theoretically supported single-factor model.
Figure 8:

Generalized Self-Efficacy CFA
Next, measurement invariance was examined for the two experimental groups. The single-factor model was first estimated such that the factor loadings were constrained to be equal. The model demonstrated strong fit ($\chi^2_{(20)} = 17.30, p > .05$, CFI = 1.00, TLI = 1.00, RMSEA = .00, SRMS = .06) and did not fit the data significantly worse ($\Delta\chi^2_{(5)} = 6.37, p > .05$) than the freely estimated model ($\chi^2_{(15)} = 10.93, p > .05$, CFI = 1.00, TLI = 1.00, RMSEA = .00, SRMS = .04). These results verified measurement invariance for optimism across the experimental groups.

![Optimism CFA](image)

Figure 9: Optimism CFA
**Locus of Control**

A CFA tested the factor structure of the locus of control construct in the full sample. The 40 items were modeled to indicate a single latent factor, although fit of this initial model was poor ($\chi^2(20) = 1576.34$, $p < .001$, CFI = .45, TLI = .42, RMSEA = .06, SRMS = .08). This finding was not surprising given the dichotomous nature of the items and the known limitations of model fit with a large number of indicators (Kline, 1998).

One proposed solution to poor item fit when scales contain a large number of items is to aggregate item level data into composites known as parcels. The following steps were taken to develop parcels for locus of control.

First, an exploratory factor analysis was used to examine the factor structure of the locus of control construct. A large number of eigenvalues above one were found, but after inspecting the results it became clear that the additional factors represented method effects based on item wording and non-meaningful subfactors. Therefore, a single factor model was used as the basis for item parceling. Research recommends creating a relatively small but meaningful set of parcels (Kline, 1998). As such, four ten-item parcels were developed in a manner that ensured a balanced level of item saturation across the 4 parcels to maximize the factor loadings of the parcels. Item loadings from the exploratory factor analysis were sorted from strongest to weakest. Then, items were selected from the sorted list one at a time (starting with the highest loading item) and assigned to one of the four parcels until all items were exhausted. This resulted in four ten-item parcels that were a balanced composite of the original 40 items in the scale.

A confirmatory factor analysis then tested the fit of this single factor model with four parcels loading on the factor (see Figure 10). The results of this analysis
demonstrated excellent fit for this model ($\chi^2 (2) = 1.79 \ p > .05$, CFI = 1.00, TLI = 1.00, RMSEA = .00, SRMS = .02), as all factor loadings were significant and relatively strong. As such, the parceled model was retained for further analyses. Next, measurement invariance was examined for the experimental groups. First, the model with equal factor loadings was tested. The results of the test demonstrated good fit for the constrained model ($\chi^2 (7) = 9.59 \ p > .05$, CFI = .98, TLI = .97, RMSEA = .07, SRMS = .06). The test of the freely estimated model indicated acceptable fit ($\chi^2 (4) = 7.97 \ p > .05$, CFI = .97, TLI = .92, RMSEA = .11, SRMS = .04); however, the fit of the constrained model did not significantly differ from the freely estimated model ($\Delta \chi^2 (3) = 1.63, \ p > .05$) and was more parsimonious. Therefore, the results suggested measurement invariance for locus of control across the experimental groups.
Figure 10:

Locus of Control CFA
Goal Orientation

Confirmatory factor analysis tested the three-factor structure of goal orientation (mastery orientation, performance approach orientation, and performance avoid orientation). A three-factor model was specified where items were only allowed to load on their respective factor. The test of this model resulted in acceptable fit ($\chi^2_{(184)} = 267.14$, $p > .05$, CFI = .93, TLI = .92, RMSEA = .05, SRMS = .08); however, modification indices suggested better fit would be achieved by allowing a performance approach item to cross load on both the mastery orientation and performance avoid orientation factors. Given this item’s low loading on the performance approach factor and its significant cross-loading, this item was removed from further analyses. A second CFA was performed on the remaining items; the fit of this model was good ($\chi^2_{(165)} = 197.54$, $p < .05$, CFI = .97, TLI = .97, RMSEA = .04, SRMS = .06), and all items loaded significantly on their respective factor (see Figure 11).

Next, measurement invariance was tested to ensure similar latent structure between experimental groups. A constrained measurement model with equal factor loadings across groups was first specified. The test of this model suggested that the model fit the data fairly well ($\chi^2_{(345)} = 430.27$, $p < .05$, CFI = .93, TLI = .92, RMSEA = .07, SRMS = .09). The freely estimated model demonstrated similar fit ($\chi^2_{(328)} = 416.99$, $p < .05$, CFI = .93, TLI = .92, RMSEA = .06, SRMS = .09) compared to the constrained model and was not a significant improvement ($\Delta\chi^2_{(17)} = 13.28$, $p > .05$) over the more parsimonious equal factor loadings model. This evidence indicated measurement invariance across the groups for the goal orientation construct.
Figure 11:
Learning Goal Orientation CFA
**Motivation to Learn**

Given the very strong relationship with task effort (r = .80), an exploratory factor analysis was performed including the 11 motivation-to-learn items and the five task effort items. The results of the analysis revealed three Eigenvalues above 1, and that a three-factor solution (RMSR of .05) fit the data significantly better than a one-(\(\chi^2_{(29)} = 166.45, p < .001\)) and two-factor (\(\chi^2_{(14)} = 84.056, p < .001\)) solution. The first two factors consisted of motivation-to-learn items. The first factor (four items) indicated a desire to learn and the second factor (four items) indicated confidence in learning (two items were removed due to low item loadings and cross loadings). The third factor consisted of the five task effort items, and one motivation-to-learn item that also reflected effort.

A confirmatory factor analysis was then performed to verify the three-factor structure in the remaining 14 items. The results of the CFA for the full sample indicated good fit (\(\chi^2_{(74)} = 134.04, p < .001, \text{CFI} = .94, \text{TLI} = .93, \text{RMSEA} = .07, \text{SRMS} = .06\)). Next, a higher-order factor model was examined where the three motivation to learn factors were specified to load on a single higher-order factor. Because this model was equivalent to the first-order model, the fit was identical (\(\chi^2_{(74)} = 134.04, p < .001, \text{CFI} = .94, \text{TLI} = .93, \text{RMSEA} = .07, \text{SRMS} = .06\)). However, the factor loadings of the three first-order factors on the higher-order factor (.94, .65, and .84) were strong and significant. Given these results and the conceptual nature of the items and scale, the single-factor higher-order model (see Figure 12) was retained for further analysis.

Measurement invariance was examined across the two experimental groups to ensure similar measurement in each condition. First, the higher-order model with three
Figure 12: Motivation to Learn CFA
first-order factors was estimated freely across the two groups. Then, a constrained model holding factor loadings equal across conditions was compared to the freely estimated model. The results showed that the fit of the constrained model \( \chi^2_{(160)} = 228.42, p < .001, \text{CFI} = .94, \text{TLI} = .93, \text{RMSEA} = .07, \text{SMRS} = .09 \) was not significantly different \( (\Delta \chi^2_{(13)} = 15.52, p > .05) \) than the freely estimated model \( \chi^2_{(147)} = 212.90, p < .001, \text{CFI} = .94, \text{TLI} = .92, \text{RMSEA} = .08, \text{SMRS} = .07 \), thus demonstrating measurement invariance across the experimental groups.

**Computer Anxiety**

A confirmatory factor analysis verified the factor structure of the computer anxiety scale (see Figure 13). The specified one-factor model with 12 items resulted in good fit \( \chi^2_{(49)} = 105.84, p < .001, \text{CFI} = .95, \text{TLI} = .94, \text{RMSEA} = .08, \text{SMRS} = .05 \) for the full sample. In addition to the fit of the single factor model, measurement invariance was also examined for computer anxiety across the two experimental groups. The results of the CFA indicated that the constrained model \( \chi^2_{(108)} = 207.44, p < .001, \text{CFI} = .92, \text{TLI} = .91, \text{RMSEA} = .11, \text{SMRS} = .09 \) did not fit significantly worse \( (\Delta \chi^2_{(13)}^2 = 12.63, p > .05) \) than the model where loadings were freely estimated \( \chi^2_{(97)} = 105.84, p < .001, \text{CFI} = .92, \text{TLI} = .90, \text{RMSEA} = .11, \text{SMRS} = .07 \). These results indicate that there was measurement invariance across the experimental groups for computer anxiety.

**Hypothesis Testing**

Having examined the measurement structure and invariance of the latent variables in the model, a full structural model representing the hypothesized effects was estimated for the entire sample. Given the large number of paths in the model due to the number of individual items per construct, item parcels were developed for those latent constructs.
Figure 13:

Computer Anxiety CFA
with more than seven items that had previously demonstrated unidimensionality (generalized self-efficacy, motivation to learn, and computer anxiety). Parcels were developed following the same process used for the locus of control construct. First, items were loaded onto a single factor and sorted based on factor loadings from highest to lowest. Then, items were chosen one at a time (starting with the strongest loading item) and placed into a parcel until no items remained. This resulted in three parcels for generalized self-efficacy, two parcels for motivation to learn, and three parcels for computer anxiety. The analysis of this model (see Figure 14) indicated good fit for the full sample ($\chi^2_{(540)} = 666.71, p < .001$, CFI = .94, TLI = .93, RMSEA = .04, SMRS = .07) and, therefore, was used as the baseline model for further hypothesis testing.

*Generalized Self-Efficacy*

Hypothesis 1a stated that generalized efficacy would be positively related to training process variables. As shown in the full sample model, the relationship between generalized efficacy and motivation was in the expected direction ($\beta = .24, p < .10$) but was not significant at the $p < .05$ level. The relationship between generalized self-efficacy and time spent on the second training module ($\beta = -.19, p < .05$) was also not significant. Next, the relationship between generalized self-efficacy and training process variables was examined separately by experimental condition. The results showed that generalized self-efficacy did significantly relate to motivation to learn in the positive feedback condition ($\beta = .42, p < .05$); however, general efficacy was unrelated to motivation in the
Figure 14:
Latent Path Model Full Sample
negative feedback condition ($\beta = .08, p > .05$). Regarding time spent on the training, the relationship with generalized self-efficacy approached significance in the negative feedback condition ($\beta = -.31, p < .10$), although in the opposite direction. Time on task and generalized self-efficacy were not significantly related in the positive feedback condition ($\beta = -.01, p < .10$). These results indicated that Hypothesis 1a was not supported.

Hypothesis 1b stated that there would be an interaction effect such that the relationship between generalized self-efficacy and training process variables would be moderated by the type of feedback received. To test this hypothesis, three models were examined. The first model allowed for free path estimation of the paths between generalized self-efficacy and the training process variables across the two experimental conditions ($\chi^2_{(1099)} = 1436.624, p < .01$). Two additional models were estimated, one in which the path between generalized efficacy and motivation to learn was constrained to be equal across conditions ($\chi^2_{(1100)} = 1438.569, p < .01$), and a second where the path between generalized efficacy and time on training was constrained to be equal ($\chi^2_{(1100)} = 1438.646, p < .01$). The change in degrees of freedom between the freely estimated model and the two constrained models allows for a test of improved fit. A significant increase in chi square (indicating worse fit) for the constrained models would indicate the presence of an interaction effect. The results of the test indicated a non-significant change in chi-square for the interaction on motivation to learn ($\Delta\chi^2_{(1)} = 1.95, p > .05$), and a non-significant change in chi square ($\Delta\chi^2_{(1)} = 2.02, p > .05$) for the interaction on time spent on training. As such, Hypothesis 1b was not supported.
Hypothesis 1c posited a mediated model such that the effect of generalized self-efficacy on training performance would function through training process variables. A number of analytic approaches are available to test for a mediation effect. Baron and Kenny’s (1986) causal steps approach is popular in research examining mediated relationships; however, their method provides no direct statistical test of the indirect effect in these types of models and generally lacks statistical power (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Sobel (1982) offered a solution to this limitation by introducing a means to statistically test the significance of the indirect effect in mediated models. To test the indirect effect, the two paths in the mediated model (IV to the mediator, and mediator to the DV) are multiplied, and the resulting value is compared to a distribution of values resulting in a z-test. Sobel’s method for testing mediation was adopted to test for mediation in the current study.

Regarding Hypothesis 1c, two indirect effects were tested, one for motivation to learn, and one for time on task. In the positive feedback condition (see Figure 15), the indirect effect from generalized self-efficacy to performance through motivation to learn ($\beta = .02$) was not significant ($z = .54$, $p > .05$). Additionally, the indirect effect from generalized self-efficacy to performance via time on task ($\beta = .01$) was not significant ($z = .29$, $p > .05$). In the negative feedback condition (see Figure 16), the indirect effect via motivation ($\beta = .06$) and the indirect effect via time on task ($\beta = -.02$) were both non-significant ($z = .63$, $p > .05$; $z = -.36$, $p > .05$). These results indicate Hypothesis 1c was not supported as the training process variables did not significantly mediate the relationship between generalized self-efficacy and performance.
Figure 15:
Latent Path Model Positive Feedback Condition
Figure 16:

Latent Path Model Negative Feedback Condition
Hypothesis 1d stated that generalized self-efficacy would demonstrate incremental prediction of training process variables above more specific training efficacy. Hierarchical regression analysis was used to test this hypothesis. First, a two-step model was tested where training motivation was regressed on training self-efficacy in step one, and then generalized self-efficacy was entered at step two. This model was evaluated for the full sample and by experimental condition. The results of the analysis for the full sample revealed that training-specific efficacy significantly predicted training motivation ($\beta = .18, t = 2.29, p < .05$) in the first step and accounted for 3% of the variability in motivation to learn ($R^2 = .03$). In the second step, adding generalized self-efficacy resulted in a non-significant increase in variance accounted for in motivation to learn ($\Delta R^2 = .01, F = 2.13, p > .05$).

For the positive feedback condition, the same two-step model was examined. The results showed that training self-efficacy significantly predicted motivation in step one of the model ($\beta = .26, t = 2.34, p < .05$) and accounted for 7% of the variability in motivation to learn ($R^2 = .07$). In step two, generalized self-efficacy predicted significant incremental variance in motivation to learn ($\Delta R^2 = .05, F = 4.12, p > .05$) above and beyond training self-efficacy. Combined, training-specific and generalized self-efficacy accounted for 12% of the variability in motivation in the positive feedback condition. However, in the negative feedback condition, neither training-specific self-efficacy ($\beta = .18, t = 2.29, p < .05$) nor generalized self-efficacy ($\Delta R^2 = .01, F = 2.13, p > .05$) significantly accounted for variability in motivation to learn.

Regarding time spent on the training task, the results of the analysis for the full sample revealed that training-specific efficacy significantly predicted time on task ($\beta = -$
.20, t = 2.51, p < .05) in the first step and accounted for 4% of the variability in time spent on task (\(R^2 = .04\)). In the second step, adding generalized efficacy resulted in a non-significant increase in variance accounted for in time spent on the training (\(\Delta R^2 = .01, F = .72, p > .05\)). For the positive feedback condition, the results showed that training self-efficacy failed to significantly predict time on task in step one of the model (\(\beta = -.13, t = 1.18, p > .05\)) since it only accounted for 2% of the variability in time spent on the training module (\(R^2 = .02\)). In step two, generalized efficacy failed to predict significant incremental variance in time on task (\(\Delta R^2 = .00, F = .01, p > .05\)) above and beyond training self-efficacy. Combined, training-specific and generalized self-efficacy accounted for just 2% of the variability in time spent on the training in the positive feedback condition. In the negative feedback condition, training-specific self-efficacy did significantly predict time spent in the training module (\(\beta = -.25, t = 2.30, p < .05\)) and accounted for 6% of the variability in time on task. However, generalized self-efficacy failed to account for a significant amount of variability in time on task above and beyond training-specific self-efficacy. (\(\Delta R^2 = .01, F = .85, p > .05\)). Taken together, these results primarily indicated a lack of support for Hypothesis 1d.

**Goal Orientation**

Hypothesis 2a stated that mastery orientation would be positively related to training process variables in both conditions. As shown in the full sample model, the relationship between mastery orientation and motivation to learn was in the expected direction (\(\beta = .20, p < .10\)) but was not significant at the \(p < .05\) level. The relationship between motivation to learn and time spent on the second training module (\(\beta = .02, p > .05\)) was not significant. Examining the model by experimental condition produced
similar results. In the positive and negative conditions, neither of the relationships between mastery orientation and motivation to learn (positive: $\beta = .17, p > .05$) (negative: $\beta = .25, p > .05$) or mastery orientation and time (positive: $\beta = -.02, p > .05$) (negative: $\beta = .10, p > .05$) were significant. These findings indicated that Hypothesis 2a was not supported.

Hypothesis 2b posited an interaction effect such that the relationship between performance approach orientation and training process variables would be moderated by the type of feedback received. To test this hypothesis, three models were examined. The first model allowed for free path estimation of the paths between performance approach orientation and the training process variables across the two experimental conditions ($\chi^2_{(1099)} = 1436.624, p < .01$). Two additional models were estimated, one in which the path between performance approach and motivation to learn was constrained to be equal across conditions ($\chi^2_{(1099)} = 1436.626, p < .01$), and a second where the path between performance approach orientation and time on training was constrained to be equal ($\chi^2_{(1099)} = 1437.28, p < .01$). The change in degrees of freedom between the freely estimated model and the two constrained models allows for a test of improved fit. A significant increase in chi square for the constrained models would provide evidence of a significant interaction effect. The results of the test indicated a non-significant change in chi square for the interaction on motivation to learn ($\Delta \chi^2_{(1)} = 0, p > .05$), and a non-significant change in chi square ($\Delta \chi^2_{(1)} = .67, p > .05$) for the interaction on time spent on training. As such, Hypothesis 2b was not supported.

Hypothesis 2c stated there would be an interaction effect such that the relationship between performance avoid orientation and training process variables would be
moderated by the type of feedback received. To test this hypothesis, three models were examined. The first model allowed for free path estimation of the paths between performance avoid orientation and the training process variables across the two experimental conditions ($\chi^2_{(1099)} = 1436.624, p < .01$). Two additional models were estimated, one in which the path between performance avoid orientation and motivation to learn was constrained to be equal across conditions ($\chi^2_{(1099)} = 1437.81, p < .01$), and a second where the path between performance avoid orientation and time on training was constrained to be equal ($\chi^2_{(1099)} = 1438.86, p < .01$). The results of the chi square change tests indicated a non-significant change in chi square for the interaction on motivation to learn ($\Delta\chi^2_{(1)} = 1.19, p > .05$), and a non-significant change in chi square ($\Delta\chi^2_{(1)} = 2.24, p > .05$) for the interaction on time spent on training. These findings indicated Hypothesis 2c was not supported.

Hypothesis 2d posited that training process variables mediated the relationship between goal orientation (mastery, performance approach, and performance avoid orientation) and training performance. Two sets of indirect effects were tested, one for motivation to learn, and one for time on task. In the positive feedback condition, the indirect effects from mastery, performance approach, and performance avoid orientation to performance via motivation to learn resulted in indirect effects of $\beta = .02$, $\beta = .02$, and $\beta = .02$ respectively. The Sobel test indicated that none of the mediating effects were significant ($z = .57, p > .05; z = -.27, p > .05; z = .24, p > .05$). Additionally, the indirect effect from mastery, performance approach, and performance avoid orientation to performance via time spent on training (\(\beta = .01; \beta = .01; \beta = .01\)) were also non-significant ($z = .11, p > .05; z = -.04, p > .05; z = -.20, p > .05$). Similarly, in the negative
feedback condition, the indirect effects of mastery, performance approach, and performance avoid orientation via motivation (\( \beta = .04; \beta = .05; \beta = .05 \)) were not significant (\( z = .67, p > .05; z = -.39, p > .05; z = .35, p > .05 \)). Finally, the indirect effects via time on task (\( \beta = .06; \beta = -.08; \beta = .07 \)) were also non-significant (\( z = .80, p > .05; z = -.41, p > .05; z = .30, p > .05 \)). Given these results, Hypothesis 2d was not supported, as the training process variables did not significantly mediate the relationships between goal orientation and training performance.

Exploratory Hypothesis one suggested that the strength of the relationships between goal orientation and training process variables would vary such that in the positive feedback condition mastery orientation will demonstrate the strongest positive relationship, performance approach the second-strongest, and performance avoid the weakest. In order to examine this hypothesis, bivariate relationships were examined. As seen in Table 5, the relationships between the three goal orientation variables (mastery, performance approach, and performance avoid) and motivation to learn to follow the general pattern as specified in the exploratory hypothesis (\( r = .25^*, r = .15, r = .09 \)). Additional analysis tested whether the relationships significantly differed. To test for the equality of two dependent correlation coefficients, the Hotelling-Williams test was employed (Bobko, 1995). As seen in Table 8, the results indicated no significant differences between the correlations.
Table 8

Hotelling-Williams Tests for Goal Orientation and Motivation to Learn Positive Condition

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Note: Values in parentheses indicate which variables were compared. T values under 1.99 are non-significant.

A similar pattern of results was observed for goal orientation and task effort. As seen in Table 5, mastery orientation has a mildly positive relationship with task effort ($r = .20$) while performance approach and performance avoid orientation had smaller and nearly equal positive relationships with task effort ($r = .11; r = .10$ respectively) As with motivation to learn, the pattern of relationships resembles the pattern hypothesized; however, none of the relationships were statistically significant on their own, nor were they significantly different from each other based on the results of the Hotelling-Williams test (see Table 9).

Table 9

Hotelling-Williams Tests for Goal Orientation and Task-Effort Positive Condition

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<th>Variables</th>
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<td>3. Performance Avoid Orientation and Task Effort</td>
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</table>

Note: Values in parentheses indicate which variables were compared. T values under 1.99 are non-significant.
Next, the relationships between goal orientation and time on task were examined. As can be seen in Table 5, the pattern of relationships differed from what was hypothesized, since mastery orientation has a slight negative relationship \((r = -0.03)\) with time on task, and performance approach and performance avoid orientation had small positive relationships \((r = 0.09; r = 0.06\) respectively). Notably, these bivariate relationships were all near zero and non-significant, and the Hotelling-Williams test for differences showed that none of the correlations were significantly different from each other (see Table 10).

Table 10

<table>
<thead>
<tr>
<th>Hotelling-Williams Tests for Goal Orientation and Time on Task Positive Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variables</strong></td>
</tr>
<tr>
<td>1. Mastery Orientation &amp; Time on Task</td>
</tr>
<tr>
<td>2. Performance Approach Orientation and Time on Task</td>
</tr>
<tr>
<td>3. Performance Avoid Orientation and Time on Task</td>
</tr>
</tbody>
</table>

Note: Values in parentheses indicate which variables were compared. T values under 1.99 are non-significant.

Overall, although the pattern of relationships proposed were partially observed in the data for the positive feedback condition, the results primarily failed to support exploratory Hypothesis 1.

Exploratory Hypothesis 2 stated that the strength of the relationships between goal orientation and training process variables will vary such that in the negative feedback condition mastery orientation will demonstrate a strong positive relationship, performance avoid a strong negative relationship, and performance approach a moderate negative relationship. First, looking at the relationships between motivation to learn and
goal orientation, one can see in Table 6 that the relationships did not match the expected pattern. Mastery orientation was mildly positively related to motivation to learn ($r = .07$); however, performance avoid ($r = .09$) and performance approach orientation ($r = .05$) were also weakly positively related to motivation to learn, which was opposite of what was expected. Additionally, these bivariate relationships were not significantly related to motivation to learn in the negative feedback condition, nor were they statistically different from each other (see Table 11 for results of Hotelling-Williams tests).

Table 11

| Hotelling-Williams Tests for Goal Orientation and Motivation to Learn Negative Condition |
|---------------------------------|-----------------|-----------------|
| Variables                        | $R$             | $T$             |
| 1. Mastery Orientation & Motivation to Learn | .07             | .13 (1 & 2)    |
| 2. Performance Approach Orientation and Motivation to Learn | .09             | .34 (2 & 3)    |
| 3. Performance Avoid Orientation and Motivation to Learn | .05             | .11 (1 & 3)    |

Note: Values in parentheses indicate which variables were compared. $T$ values under 1.99 are non-significant.

Regarding the relationships between goal orientation and task effort, the pattern more closely resembles what was expected in exploratory Hypothesis 2. Mastery orientation had a mild positive relationship with task effort ($r = .14$), while both performance avoid ($r = -.08$) and performance approach orientation ($r = -.04$) were mildly negatively correlated with task effort. However, despite finding that the pattern of relationships was as hypothesized, none of the correlations were significant on their own, or in comparison to each other (see Table 12 for results of Hotelling-Williams tests).
Table 12

**Hotelling-Williams Tests for Goal Orientation and Task- Effort Negative Condition**

<table>
<thead>
<tr>
<th>Variables</th>
<th>$R$</th>
<th>$T$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mastery Orientation &amp; Task Effort</td>
<td>.14</td>
<td>1.41 (1 &amp; 2)</td>
</tr>
<tr>
<td>2. Performance Approach Orientation and Task Effort</td>
<td>-.08</td>
<td>.34 (2 &amp; 3)</td>
</tr>
<tr>
<td>3. Performance Avoid Orientation and Task Effort</td>
<td>-.04</td>
<td>.99 (1 &amp; 3)</td>
</tr>
</tbody>
</table>

Note: Values in parentheses indicate which variables were compared. T values under 1.99 are non-significant.

The final set of relationships between goal orientation and time spent training were opposite from what was expected. Mastery orientation had a mild but non-significant negative relationship with time spent on task in the negative feedback condition ($r = -.14$), while performance approach orientation and time on task were essentially unrelated ($r = -.01$) and performance approach orientation and time on task were significantly positively related ($r = .24, p < .05$). Tests for differences (see Table 13) in the bivariate relations revealed one significant difference between the mastery approach/time on task and performance avoid/time on task correlations ($z = 2.41, p < .01$).

Table 13

**Hotelling-Williams Tests for Goal Orientation and Time on Task Negative Condition**

<table>
<thead>
<tr>
<th>Variables</th>
<th>$R$</th>
<th>$T$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mastery Orientation &amp; Time on Task</td>
<td>-.14</td>
<td>.80 (1 &amp; 2)</td>
</tr>
<tr>
<td>2. Performance Approach Orientation and Time on Task</td>
<td>-.01</td>
<td>1.26 (2 &amp; 3)</td>
</tr>
<tr>
<td>3. Performance Avoid Orientation and Time on Task</td>
<td>.24</td>
<td>2.91* (1&amp; 3)</td>
</tr>
</tbody>
</table>

**Note:** Values in parentheses indicate which variables were compared.
Overall, although some of the patterns of relationships supported exploratory Hypothesis 2, the lack of statistical significance and, in some cases, opposite direction of relationships indicate a general lack of support for exploratory Hypothesis 2.

**Optimism**

Hypothesis 3a stated that optimism would be positively related to training process variables in both conditions. As shown in the full sample model, neither the relationship between optimism and motivation ($\beta = .13$, $p < .10$) nor optimism and time on training ($\beta = .07$, $p < .10$) were significant at the $p < .05$ level. Examining the relationships in experimental conditions produced similar results. In the positive and negative conditions, none of the relationships between optimism and motivation to learn (positive: $\beta = .20$, $p > .05$) (negative: $\beta = .18$, $p > .05$) or optimism and time (positive: $\beta = .27$, $p > .05$) (negative: $\beta = .07$, $p > .05$) were significant. These findings indicated that Hypothesis 3a was not supported.

Hypothesis 3b posited an interaction effect such that the relationship between optimism and training process variables would be moderated by the type of feedback received. To test this hypothesis, three models were examined. The first model allowed for free path estimation of the paths between optimism and the training process variables across the two experimental conditions ($\chi^2_{(1099)} = 1436.624$, $p < .01$). Two additional models were estimated, one in which the path between optimism and motivation to learn was constrained to be equal across conditions ($\chi^2_{(1099)} = 1436.834$, $p < .01$), and a second where the path between optimism and time on training was constrained to be equal ($\chi^2_{(1099)} = 1436.65$, $p < .01$). The results of the chi square change tests indicated a non-significant change in chi-square for the interaction on motivation to learn ($\Delta\chi^2_{(11)} = .21$, $p$
> .05), and a non-significant change in chi square ($\Delta \chi^2_{(1)} = .03, p > .05$) for the interaction on time spent on training. As such, Hypothesis 3b was not supported.

Hypothesis 3c stated training process variables mediated the relationship between optimism and training performance. As such, two indirect effects were tested, one for motivation to learn, and one for time on task. In the positive feedback condition, the indirect effect from optimism to performance through motivation to learn ($\beta = .01$), was not significant ($z = .24, p > .05$). Additionally, the indirect effect from optimism to performance via time spent training ($\beta = -.01$) was also not significant ($z = -.19, p > .05$). Similarly, in the negative feedback condition, the indirect effect via motivation ($\beta = .03$) and the indirect effect via time on task ($\beta = .02$) were both non-significant ($z = .26, p > .05; z = .21, p > .05$). The findings failed to support Hypothesis 3c, as the training process variables did not significantly mediate the relationship between optimism and performance.

*Locus of Control*

Hypothesis 4a stated that locus of control would be positively related to training process variables in both conditions. As shown in the full sample model, the relationship between locus of control and motivation ($\beta = -.43, p < .05$) was significant, but in the opposite direction. The relationship between locus of control and time on training ($\beta = -.02, p > .05$), however, was small and non-significant. Examining the relationships in experimental conditions produced similar results. In the positive and negative conditions, the relationship between locus of control and motivation to learn (positive: $\beta = -.43, p < .05$) (negative: $\beta = -.58, p < .05$) was strong and significant, but again opposite in expected direction. The relationship between locus of control and time spent on training,
These findings indicated that Hypothesis 4a was generally not supported.

Hypothesis 4b posited an interaction effect such that the relationship between locus of control and training process variables would be moderated by the type of feedback received. To test this hypothesis, three models were examined. The first model allowed for free path estimation of the paths between locus of control and the training process variables across the two experimental conditions ($\chi^2 (1099) = 1436.624, p < .01$). Two additional models were estimated, one in which the path between locus of control and motivation to learn was constrained to be equal across conditions ($\chi^2 (1099) = 1436.663, p < .01$), and a second where the path between locus of control and time on training was constrained to be equal ($\chi^2 (1099) = 1440.60, p < .01$). The results of the chi square change tests indicated a non-significant change in chi square for the interaction between locus of control and feedback on motivation to learn ($\Delta \chi^2 (1) = .04, p > .05$). The chi square change test for the interaction between locus of control and feedback on time demonstrated a significant change ($\Delta \chi^2 (1) = 3.98, p < .05$), thus indicating a significant interaction effect (see Figure 17). As expected, the relationship between locus of control and time on task was positive in the negative feedback condition indicating those with an external locus of control spent more time on the training task. The relationship between locus of control and time on task for those in the positive feedback condition was negative, indicating that those with a more internal locus of control spent less time on task after receiving positive feedback. Overall, these findings limited support for Hypothesis 4b.

Hypothesis 4c stated that training process variables mediated the relationship between locus of control and training performance. As such, two indirect effects were
tested, one for motivation to learn, and one for time on task. In the positive feedback condition, the indirect effect from locus of control to performance through motivation to learn \((\beta = -.04)\) was not significant \((z = -.74, p > .05)\). Additionally, the indirect effect from optimism to performance via time spent training \((\beta = .02)\) was also not significant \((z = .31, p > .05)\). Similarly, in the negative feedback condition, the indirect effect via motivation \((\beta = -.11)\) and the indirect effect via time on task \((\beta = .02)\) were both non-significant \((z = -.84, p > .05; z = .20, p > .05)\). In sum, the results failed to support Hypothesis 4c, since the training process variables did not significantly mediate the relationship between locus of control and performance.

Figure: 17

Locus of Control and Time on Task by Condition
**Additional Analyses**

Three additional sets of analyses were run in an attempt to clarify the primary findings. The first set of additional analyses examined whether gender may have been a factor contributing to the findings of the study. It is possible that gender had an impact on the results of the study is the nature of the training for a number of reasons. For example, as previously discussed, there are a number of stereotypes associated with driving vehicles, and also emergency vehicle driver jobs are typically held by men. These stereotypes may have manifested and had an impact on how men and women approached the training and received feedback regarding their performance. As such, a number of tests were conducted to see if there were differences in levels of the study variables between men and women. The first set of analyses examined whether there were significant differences in any of the individual difference and control variables. As seen in Table 14, there were a few differences between men and women.

Men reported having significantly higher mastery orientation, a significantly higher performance approach orientation, and greater levels of training self-efficacy. It is clear from these findings that there were some differences between men and women regarding their goal orientation and training efficacy. It is possible that these differences are tied to differential effects of the training feedback or that these would lead to differences in the process and outcome variables. Table 15 presents analyses testing for differences between men and women on manipulation check, process, and outcome variables by experimental condition.
Table 14

Descriptive Statistics and T-Tests for Pre-Training Measures by Gender

<table>
<thead>
<tr>
<th>Variable</th>
<th>Men</th>
<th>SD</th>
<th>Women</th>
<th>SD</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. WOND</td>
<td>24.46</td>
<td>5.25</td>
<td>23.41</td>
<td>5.23</td>
<td>1.23</td>
</tr>
<tr>
<td>2. CANX</td>
<td>1.84</td>
<td>.48</td>
<td>1.98</td>
<td>.67</td>
<td>-1.45</td>
</tr>
<tr>
<td>3. GSE</td>
<td>3.92</td>
<td>.46</td>
<td>3.79</td>
<td>.38</td>
<td>1.87</td>
</tr>
<tr>
<td>4. OPT</td>
<td>3.54</td>
<td>.71</td>
<td>3.51</td>
<td>.61</td>
<td>.32</td>
</tr>
<tr>
<td>5. LOC</td>
<td>30.32</td>
<td>4.41</td>
<td>29.50</td>
<td>4.82</td>
<td>1.06</td>
</tr>
<tr>
<td>6. MO</td>
<td>4.08</td>
<td>.48</td>
<td>3.87</td>
<td>.51</td>
<td>2.61**</td>
</tr>
<tr>
<td>7. PARP</td>
<td>3.61</td>
<td>.69</td>
<td>3.27</td>
<td>.69</td>
<td>3.00**</td>
</tr>
<tr>
<td>8. PAVD</td>
<td>2.88</td>
<td>.72</td>
<td>2.85</td>
<td>.65</td>
<td>.30</td>
</tr>
<tr>
<td>9. TSE</td>
<td>3.96</td>
<td>.45</td>
<td>3.75</td>
<td>.38</td>
<td>3.16**</td>
</tr>
</tbody>
</table>

Note: WOND = Wonderlic, CANX = Computer Anxiety, GSE = Generalized Self-Efficacy, OPT = Optimism, LOC = Locus of Control, MO = Mastery Orientation, PARP = Performance Approach Orientation, PAVD = Performance Avoid Orientation, TSE = Training Self-Efficacy, MOT = Motivation to Learn, TASEF = Task Effort, TIME2 = Time in Minutes Spent in Training Module 2, PERF = Performance on Training Test, MANIP = Manipulation Check. The Wonderlic score ranges from 0–52. The Locus of Control Scale ranges from 0–40 and is scored such that a higher score indicates an internal locus of control. The training performance test ranged in score from 0–38.

* p < .05, ** p < .01

Table 15

Descriptive Statistics and T-Tests for Training Process, Outcome, and Manipulation Check Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Men</th>
<th>SD</th>
<th>Women</th>
<th>SD</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. MOT</td>
<td>3.57</td>
<td>.53</td>
<td>3.52</td>
<td>.46</td>
<td>.81</td>
</tr>
<tr>
<td>2. TASKEF</td>
<td>3.51</td>
<td>.72</td>
<td>3.45</td>
<td>.66</td>
<td>.49</td>
</tr>
<tr>
<td>3. TIME</td>
<td>1726.50</td>
<td>187.75</td>
<td>1754.95</td>
<td>159.71</td>
<td>-1.01</td>
</tr>
<tr>
<td>4. TEST</td>
<td>29.61</td>
<td>3.36</td>
<td>29.12</td>
<td>3.57</td>
<td>.84</td>
</tr>
<tr>
<td>5. MANIP</td>
<td>3.38</td>
<td>1.27</td>
<td>3.11</td>
<td>1.24</td>
<td>1.31</td>
</tr>
<tr>
<td>6. FACC</td>
<td>3.49</td>
<td>.75</td>
<td>3.30</td>
<td>.87</td>
<td>1.41</td>
</tr>
</tbody>
</table>

Note: Sample size: Men = 57 Women = 103

For both the positive and negative feedback conditions, no significant differences were found between the manipulation check, process, and outcomes variables (see Table 16 and Table 17). Thus, while pre-training individual difference variables differed
slightly between men and women, these differences did not translate into mean level
differences on process and outcome variables.

Table 16

Descriptive Statistics and T-Tests for Training Process, Outcome, and Manipulation
Check Variables Positive Feedback Condition

<table>
<thead>
<tr>
<th>Variable</th>
<th>Men</th>
<th>Women</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. MOT</td>
<td>3.55, .58</td>
<td>3.49, .49</td>
<td>.49</td>
</tr>
<tr>
<td>2. TASKEF</td>
<td>3.39, .77</td>
<td>3.38, .74</td>
<td>.06</td>
</tr>
<tr>
<td>3. TIME</td>
<td>1735.81, 100.36</td>
<td>1761.79, 133.73</td>
<td>-.93</td>
</tr>
<tr>
<td>4. TEST</td>
<td>30.26, 2.77</td>
<td>29.37, 3.16</td>
<td>1.29</td>
</tr>
<tr>
<td>5. MANIP</td>
<td>4.48, .38</td>
<td>4.35, .36</td>
<td>1.53</td>
</tr>
<tr>
<td>6. FACC</td>
<td>3.88, .46</td>
<td>3.72, .75</td>
<td>1.06</td>
</tr>
</tbody>
</table>

Note: Sample Size: Men = 31 Women = 49

Table 17

Descriptive Statistics and T-Tests for Training Process, Outcome, and Manipulation
Check Variables Negative Feedback Condition

<table>
<thead>
<tr>
<th>Variable</th>
<th>Men</th>
<th>Women</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. MOT</td>
<td>3.63, .47</td>
<td>3.55, .42</td>
<td>.75</td>
</tr>
<tr>
<td>2. TASKEF</td>
<td>3.64, .65</td>
<td>3.51, .58</td>
<td>.89</td>
</tr>
<tr>
<td>3. TIME</td>
<td>1715.41, 258.15</td>
<td>1748.74, 181.13</td>
<td>-.67</td>
</tr>
<tr>
<td>4. TEST</td>
<td>28.85, 3.87</td>
<td>28.91, 3.93</td>
<td>-.07</td>
</tr>
<tr>
<td>5. MANIP</td>
<td>2.08, .42</td>
<td>1.99, .41</td>
<td>.88</td>
</tr>
<tr>
<td>6. FACC</td>
<td>3.03, .77</td>
<td>2.92, .79</td>
<td>.59</td>
</tr>
</tbody>
</table>

Note: Sample Size: Men = 26 Women = 54

Next, correlations were calculated between study variables for men and
women, by condition, to gain a sense of the pattern of relationships. In examining the
pattern of relationships, it appears there may be differences in the relationships of study
variable between men and women by condition (see Table 18 and Table 19). These
findings suggested that the model proposed in this study may function differently for men
and women. Most notable was the finding that motivation to learn was not related to
Table 18

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Wonderlic</td>
<td>-</td>
<td>.31</td>
<td>.12</td>
<td>.04</td>
<td>.12</td>
<td>-.15</td>
<td>.08</td>
<td>.31</td>
<td>.03</td>
<td>-.09</td>
<td>.19</td>
<td>.22</td>
<td>.43*</td>
</tr>
<tr>
<td>2. Computer Anxiety</td>
<td>-.28</td>
<td>-</td>
<td>-.27</td>
<td>-.39*</td>
<td>-.35</td>
<td>.21</td>
<td>.41*</td>
<td>-.63**</td>
<td>.24</td>
<td>-.12</td>
<td>-.16</td>
<td>.01</td>
<td>-.37**</td>
</tr>
<tr>
<td>3. Generalized Self-Efficacy</td>
<td>.11</td>
<td>-.23</td>
<td>-</td>
<td>.31</td>
<td>.17</td>
<td>.04</td>
<td>-.31</td>
<td>.56**</td>
<td>.53**</td>
<td>.21</td>
<td>.10</td>
<td>-.32</td>
<td>.48**</td>
</tr>
<tr>
<td>4. Optimism</td>
<td>-.10</td>
<td>.13</td>
<td>.18</td>
<td>-</td>
<td>.37**</td>
<td>-.22</td>
<td>.46**</td>
<td>.63**</td>
<td>.53**</td>
<td>.20</td>
<td>.14</td>
<td>-.18</td>
<td>.31</td>
</tr>
<tr>
<td>5. Mastery Orientation</td>
<td>.12</td>
<td>-.03</td>
<td>.48**</td>
<td>.28**</td>
<td>-.</td>
<td>.05</td>
<td>-.30</td>
<td>.22</td>
<td>.49**</td>
<td>.38</td>
<td>.36</td>
<td>.19</td>
<td>.29</td>
</tr>
<tr>
<td>6. Performance Approach</td>
<td>-.08</td>
<td>-.17</td>
<td>.11</td>
<td>.02</td>
<td>-.07</td>
<td>-</td>
<td>.57**</td>
<td>-.27</td>
<td>.03</td>
<td>-.08</td>
<td>.01</td>
<td>.05</td>
<td>-.10</td>
</tr>
<tr>
<td>7. Performance Avoid</td>
<td>-.12</td>
<td>-.29*</td>
<td>-.06</td>
<td>-.25</td>
<td>-.29</td>
<td>.42**</td>
<td>-.</td>
<td>.49**</td>
<td>-.18</td>
<td>-.13</td>
<td>-.06</td>
<td>.06</td>
<td>-.37**</td>
</tr>
<tr>
<td>8. Locus of Control</td>
<td>.02</td>
<td>.09</td>
<td>-.02</td>
<td>.21</td>
<td>.04</td>
<td>-.19</td>
<td>.01</td>
<td>-.40*</td>
<td>.18</td>
<td>-.01</td>
<td>-.16</td>
<td>.53**</td>
<td></td>
</tr>
<tr>
<td>9. Training Self-Efficacy</td>
<td>.06</td>
<td>-.15</td>
<td>.49**</td>
<td>.10</td>
<td>.37**</td>
<td>.13</td>
<td>.01</td>
<td>-.12</td>
<td>-.45**</td>
<td>.28</td>
<td>-.21</td>
<td>.37**</td>
<td></td>
</tr>
<tr>
<td>10. Motivation to Learn</td>
<td>.07</td>
<td>-.24</td>
<td>.42**</td>
<td>.02</td>
<td>.14</td>
<td>.34**</td>
<td>.30**</td>
<td>-.14</td>
<td>.06</td>
<td>-.80**</td>
<td>.40**</td>
<td>.01</td>
<td></td>
</tr>
<tr>
<td>11. Task Effort</td>
<td>-.13</td>
<td>-.17</td>
<td>.21</td>
<td>-.01</td>
<td>.14</td>
<td>.20</td>
<td>.24</td>
<td>-.28**</td>
<td>-.01</td>
<td>.75**</td>
<td>-.</td>
<td>.21</td>
<td>-.15</td>
</tr>
<tr>
<td>12. Time on Training</td>
<td>.14</td>
<td>-.11</td>
<td>.10</td>
<td>-.02</td>
<td>-.07</td>
<td>.20</td>
<td>.05</td>
<td>-.28**</td>
<td>-.04</td>
<td>.29**</td>
<td>.19</td>
<td>-.</td>
<td>.05</td>
</tr>
<tr>
<td>13. Training Performance</td>
<td>.62**</td>
<td>.02</td>
<td>.00</td>
<td>-.05</td>
<td>.10</td>
<td>-.08</td>
<td>-.21</td>
<td>.15</td>
<td>.10</td>
<td>-.02</td>
<td>.01</td>
<td>-.</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: The correlations for women are below the diagonal break in the matrix. Time on Training = number of minutes spent in the second training module. Training Performance = performance on the second training module test. All scale scores range from 1-5 except the Wonderlic (0-50), Locus of Control (0-41), and Training Performance (0-38). Higher scores on Locus of Control indicate an internal locus of control.

* p < .05, ** p < .01
### Table 19

**Bivariate Correlations Negative Feedback Condition by Gender**

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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<tbody>
<tr>
<td>Wonderlic</td>
<td>-</td>
<td>.30</td>
<td>-</td>
<td>.48*</td>
<td>.02</td>
<td>-.29</td>
<td>-.10</td>
<td>.20</td>
<td>.06</td>
<td>-.40*</td>
<td>.32</td>
<td>-.15</td>
<td>.22</td>
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<td>-</td>
<td>-.38</td>
<td>.19</td>
<td>-.25</td>
<td>.25</td>
<td>.12</td>
<td>-.30*</td>
<td>-.42*</td>
<td>.04</td>
<td>.03</td>
<td>-.07</td>
<td>-.09</td>
</tr>
<tr>
<td>Generalized Self-Efficacy</td>
<td>.33*</td>
<td>-.24</td>
<td>-</td>
<td>.27</td>
<td>.56**</td>
<td>-.01</td>
<td>-.10</td>
<td>.49*</td>
<td>.60**</td>
<td>.09</td>
<td>.10</td>
<td>-.24</td>
<td>-.53**</td>
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<td>-.33*</td>
<td>.24</td>
<td>-</td>
<td>.47*</td>
<td>.33</td>
<td>.19</td>
<td>-.01</td>
<td>.28</td>
<td>-.09</td>
<td>.12</td>
<td>-.23</td>
<td>-.25</td>
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<tr>
<td>Mastery Orientation</td>
<td>.18</td>
<td>-.30**</td>
<td>.44**</td>
<td>.25</td>
<td>-</td>
<td>.17</td>
<td>.05</td>
<td>.25</td>
<td>.58**</td>
<td>.08</td>
<td>.09</td>
<td>-.25</td>
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<tr>
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<td>.09</td>
<td>.05</td>
<td>.03</td>
<td>-.05</td>
<td>-</td>
<td>.56**</td>
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<td>.34</td>
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<td>-.03</td>
<td>.14</td>
<td>-.34</td>
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<tr>
<td>Performance Avoid</td>
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<td>.33**</td>
<td>-.26</td>
<td>.21</td>
<td>-.48**</td>
<td>.52**</td>
<td>-</td>
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<tr>
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<td>.37**</td>
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<td>-.25</td>
<td>-.28**</td>
<td>-</td>
<td>.39**</td>
<td>-.40*</td>
<td>-.30</td>
<td>-.20</td>
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<td>Training Self-Efficacy</td>
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<td>-.02</td>
<td>-.44**</td>
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<td>.04</td>
<td>.25</td>
<td>-.44**</td>
<td>.48**</td>
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<td>.74**</td>
<td>.49**</td>
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<td>-.15</td>
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<td>.77**</td>
<td>-</td>
<td>.49**</td>
<td>-.05</td>
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<tr>
<td>Time on Training</td>
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<td>.21</td>
<td>-.18</td>
<td>.16</td>
<td>-.05</td>
<td>.10</td>
<td>.20</td>
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<td>-.10</td>
<td>.18</td>
<td>.11</td>
<td>-</td>
<td>.52**</td>
</tr>
<tr>
<td>Training Performance</td>
<td>.36**</td>
<td>-.14</td>
<td>-.03</td>
<td>.20</td>
<td>.05</td>
<td>.11</td>
<td>-.02</td>
<td>-.03</td>
<td>.01</td>
<td>.30**</td>
<td>.29*</td>
<td>.34*</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note: The correlations for women are underneath the diagonal break in the matrix. Time on Training = number of minutes spent in the second training module. Training Performance = performance on the second training module test. All scale scores range from 1-5 except the Wonderlic (0-50), Locus of Control (0-41), and Training Performance (0-38). Higher scores on Locus of Control indicate an internal locus of control.*

* *p < .05, **p < .01
performance for men in either the positive ($r = .01, p > .05$) or negative feedback condition ($r = -.11, p > .05$). However, motivation to learn was significantly related to performance for women in the negative condition ($r = .30, p > .05$), but not the positive condition. A full test of the model by gender was not feasible as the sample size for men per condition was very small (N=31 and N=26 for men per condition). Instead, the primary model was reanalyzed excluding men from the analysis (see Figure 18 and Figure 19). The results of the path model test showed a number of differences across the two conditions. First, similar to the bivariate relationships, it was found that motivation to learn ($\beta = .28, p = < .05$) and time on task ($\beta = .30, p = < .05$) significantly predicted training performance in the negative feedback condition. In the positive condition, time on task ($\beta = .28, p = < .05$) was a significant indicator of training performance; however, motivation to learn ($\beta = .14, p = > .05$) was not.

Additionally, there were some interesting relationships among the independent variables and the training process and dependent variables across condition. First, looking at the relationships between the IVs and time on task, most notable were the effects of locus of control and performance avoid orientation. In the both the positive ($\beta = .36, p = < .10$) and negative ($\beta = .39, p = < .05$) feedback condition, those with an internal locus of control spent more time on the task. Similarly, in both the positive ($\beta = .40, p = < .05$) and negative ($\beta = .40, p = < .05$) feedback condition, those adopting a performance avoid orientation spent more time on the training task. Additionally, although not significant at the traditional alpha level ($p < .05$), generalized self-efficacy was a stronger indicator of time on task in the negative ($\beta = -.36, p = < .10$) versus positive feedback condition ($\beta = .04, p = > .05$).
Figure 18:

Latent Path Model Positive Feedback Condition Women Only

Note. * = p < .05, ** = p < .05
Figure 19: Latent Path Model Negative Feedback Condition Women Only

Note: * = p < .05, ** = p < .01
Regarding the independent variables and motivation to learn, there was one clear difference across the conditions. In the positive feedback condition, none of the independent variables significantly predicted motivation to learn. In the negative feedback condition, however, locus of control was a significant indicator of motivation to learn, such that those with an external locus of control were more motivated to learn the training material ($\beta = -0.48$, $p < .05$).

The second set of additional analyses explored the possibility of a unitary concept of resilience. Some research has proposed that individual constructs like optimism and self-efficacy are best conceptualized as related parts of a more global construct (Judge et al., 1999; Stajkovic, 2006). As such, a higher-order factor analysis was conducted to examine the fit of a higher-order model for the resilience variables in the current study. A higher-order model was specified with the higher-order factor (termed Resilience) indicated by four first-order factors: generalized self-efficacy, locus of control, optimism, and mastery orientation, which, in turn, were each indicated by their respective items/parcels (see Figure 20). This model was first examined for the full sample, and the results indicated good fit for the higher-order model ($\chi^2_{(85)} = 114.25$, $p < .05$, CFI = .96, TLI = .96, RMSEA = .05, SRMS = .07).
Figure 20:
Higher Order Resilience Model
The model was then examined for each of the experimental conditions holding all factor loadings equal. The results of the analyses indicated that the constrained model fit the data reasonably well ($\chi^2_{(183)} = 219.31, p < .05, \text{CFI} = .96, \text{TLI} = .95, \text{RMSEA} = .05, \text{SRMS} = .10$), and when compared to subsequent models with first-order factors freely estimated ($\chi^2_{(181)} = 218.31, p < .05, \text{CFI} = .96, \text{TLI} = .95, \text{RMSEA} = .05, \text{SRMS} = .09$) and all factor loadings freely estimated ($\chi^2_{(170)} = 208.31, p < .05, \text{CFI} = .95, \text{TLI} = .94, \text{RMSEA} = .05, \text{SRMS} = .09$), the constrained model did not fit significantly worse ($\Delta\chi^2_{(2)} = 1.00, p > .05; \Delta\chi^2_{(13)} = 11.00, p > .05$). Overall, these results indicated that a higher-order resilience model fit the data rather well, and that the higher order structure was invariant across experimental groups.

Next, a test of the path model using the higher order resilience variable was conducted. The intent of this test was to examine model fit across feedback conditions to see if Resilience as a higher order variable had significant effects on process variables, and in turn whether the process variables impacted performance. As seen in Figure 21, the results for the positive feedback group indicate that while the resilience factors loaded well onto the higher order model, resilience had no significant effect on time on task or motivation to learn. Additionally, neither motivation to learn nor time on task significantly predicted task performance. General mental ability had the strongest effect on performance with a path coefficient of .60. For the negative feedback group, similar results were noted. As seen in Figure 22, the higher order resilience model had no significant effect on either process variable. Time on task did significantly predict performance, showing that those in the negative feedback condition who spent more time...
Figure 21:

Resilience Path Model Positive Feedback Condition
Figure 22:

Resilience Path Model Negative Feedback Condition

*Note. * = p < .05, ** = p < .01
on task scored higher on the training performance test. Motivation to learn however, had no significant effect on training performance. Finally, general mental ability had the strongest effect on performance with a path coefficient of .40. Overall, these exploratory results seem to indicate that resilience as a higher order construct has little impact on training process variables.

The final set of additional analyses were focused on the impact of task specific self-efficacy and its relation to generalized self-efficacy, training process variables, and training performance. The primary study argued that generalized self-efficacy would have an effect on training process variables and performance, and that this effect would go above and beyond the effects of task specific self-efficacy. As seen previously, generalized self-efficacy did not predict above and beyond task specific self-efficacy. A critical question remains however as to what impact did task specific self-efficacy have on study variables, and as task specific efficacy was measured at two points in the study, was there a shift in level of efficacy.

One question is whether levels of task efficacy changed over time, and if such a shift occurred whether it was different across groups. To test this question, a correlated groups t-test was conducted. As seen in Table 20, a significant shift in task specific efficacy occurred for both groups. In the positive feedback condition, task specific self-efficacy significantly increased, and in the negative feedback condition, task specific self-efficacy significantly decreased. This result provides evidence that the manipulation was successful and that task specific efficacy may have an impact on other study variables. Also of note is that at time 1, those in the negative feedback condition has significantly higher levels of task efficacy than those in the positive condition ($t = 2.23, p < .05$), and at
time 2, task specific efficacy was significantly higher for the positive feedback condition 
\((t = 3.58 \ p < .01)\).

Table 20

<table>
<thead>
<tr>
<th>Condition</th>
<th>Time 1</th>
<th>Time 2</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>1. Positive</td>
<td>3.57</td>
<td>3.85</td>
<td>3.47**</td>
</tr>
<tr>
<td>2. Negative</td>
<td>3.85</td>
<td>3.43</td>
<td>5.41**</td>
</tr>
</tbody>
</table>

Note: Sample Size: Positive = 35 Negative = 35 ** \( p < .01 \)

Having seen that task specific efficacy changed during the training, the next step is to understand what impact task specific self-efficacy had on training process variables and performance. A path model examined, by condition, the impact of task specific efficacy on study variables. It is key to note that time 1 task efficacy was studied for this analysis. As previously mentioned, two measures of task efficacy were utilized in this study. The measure used at two points in time was introduced mid way through the study, and as such the limited sample size precluded path analysis. The 12 item task efficacy measure administered prior to the feedback did have sufficient data to be included in a path model.

As seen in Figure 23, task specific efficacy had no effect on study variables in the positive feedback condition. In the negative feedback condition however, task specific efficacy had a significant impact on time on task, and time on task was a significant indicator of training performance (see Figure 24). Additionally, the indirect path from task specific efficacy to performance was significant in the negative group indicating partial mediation through time on task (\( \beta = -.25, \ p < .05 \)).
Figure 23: Task Specific Efficacy Positive Feedback Condition

Note: * = p < .05, ** = p < .01
Note. * = p < .05, ** = p < .01

Figure 24:

Task Specific Efficacy Negative Feedback Condition
Having established that task efficacy exhibited a significant effect on training process variables, the next step was to understand how task specific efficacy fit into the primary study model. Unfortunately, entry of this variable rendered the model over identified. Thus, a second model was tested that examined the effects of generalized self-efficacy and task efficacy specifically. One possibility is that task efficacy mediates the relationship between generalized efficacy and training process variables as generalized efficacy is a more global or distal variable to task specific processes. However, as seen in Figure 25 and Figure 26, task specific efficacy did not mediate the relationship between training process variables and generalized efficacy.
Note. * = p < .05, ** = p < .01

Figure 25:

Generalized and Task Specific Efficacy Positive Feedback Condition
Figure 26:
Generalized and Task Specific Efficacy Negative Feedback Condition

Note.  * = p < .05, ** = p < .01
CHAPTER V
DISCUSSION

The purpose of this study was to add to the computer-based training literature by determining whether resilience variables were important indicators of trainee motivation and performance when trainees receive feedback (positive or negative) in a multistage computer-based training environment. Given the individual nature of this type of learning (Welsh et al., 2003), and previous research supporting the utility of resilience in other contexts (Aspinwall & Taylor, 1992; Judge et al. 1999, Stajkovic, 2006), this study proposed that resilience variables (generalized self-efficacy, optimism, mastery orientation, and locus of control) would function as buffers for trainees who received information that they performed poorly in an early stage of training.

More broadly, this study proposed that the traditional training model (Colquitt et al., 2000) may not apply similarly to all trainees in all situations. The traditional training model (see Figure 1) treats training process variables such as motivation and effort as proximal indicators of training performance through which more distal variables (i.e., individual differences or situational variables) are likely to have an effect on training performance. Although Colquitt et al.’s model tends to be presented as applicable to most training situations, some research indicates that the model may not apply similarly to all training scenarios (Brown, 2001; Herold et al., 2002, Welsh et al., 2003).
Given the recent and rapid implementation of computer technology in employee training, the question of model appropriateness becomes even more important. As such, this study proposed that many of the individual difference variables presented in the classic training model would function differently for those trainees who performed poorly early in training. More specifically, it was hypothesized that resilience variables would be more strongly related to motivation and performance for trainees who received negative feedback about their performance, as these trainees would need a buffer against the negative feedback to maintain motivation and performance throughout training.

The data from study participants indicated that resilience variables were generally not significantly related to motivation, effort, time on task, or performance in the second stage of training for trainees who received either positive or negative feedback regarding training performance in the first stage of training. The two exceptions to this were locus of control and performance-avoid orientation. The results showed that that externally locused trainees tended to demonstrate higher levels of motivation to learn after receiving negative feedback; however, it was expected that internally locused trainees would have higher motivation, spend more time on task, and exert more effort after receiving negative feedback. Similarly, a performance avoid orientation was positively correlated with time spent on the second stage of training; however, it was expected that the relationship would be negative. One consistent finding for all trainees was the strong relationship between intelligence and performance. In both the positive and negative feedback conditions, general mental ability was the strongest indicator of training performance. Somewhat surprisingly, the effects of motivation, effort, and time spent learning the training material were strongest for women, and some evidence suggests this
may be due to men’s overconfidence in their ability to perform well in the training. Also, the results showed that resilience variables may be better understood as subfactors of a single higher-order construct.

In general, the results of this study do not support the need for a separate resilience-based training model for those trainees who perform poorly in early stages of computer-based training. In the sections to follow, findings pertaining to the variables of interest will be presented and discussed along with additional post hoc analyses that were performed to help clarify findings in the study. Finally, limitations of this study and future directions for research will be discussed.

*Generalized Self-Efficacy*

Generalized self-efficacy is believed to represent a more global or dispositional sense of one’s capability to perform tasks across a variety of situations and circumstances. Researchers have posited that this global estimation of one’s ability derives from one’s sense of competence from many specific tasks, and higher levels of efficacy from these tasks lead to a global estimation of efficacy that spans across differing tasks (Lennings, 1994; Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, & Rodger, 1982; Judge et al., 1999). Therefore, when faced with a novel task, such as the ambulance training in this study, a general sense of efficacy may be an important indicator of motivation to learn the novel task as specific efficacy for the task has yet to be developed. Additionally, when receiving negative feedback about one’s performance in the novel task (or as task-specific efficacy declines), a general sense of capability could help buffer the effects of declining task efficacy, and thus lead to continued higher levels of motivation.
Following the theory and logic of previous research, a number of hypotheses were proposed and tested in the current study. It was proposed that generalized self-efficacy would be positively related to training process variables (motivation to learn, time on task, and task effort) since higher efficacy has been linked to motivation and success in training in previous studies (Colquitt et al., 2000). Also, following Colquitt et al.’s general training model (see Figure 1), it was proposed that training process variables would mediate the relationship between generalized efficacy and training performance. Regarding the impact of feedback in the training, it was hypothesized that there would be an interaction such that the relationship between generalized efficacy and the training process variables would be stronger for those receiving negative feedback about their early-stage training performance because generalized efficacy would function as a buffer against negative feedback. Finally, as task efficacy has been previously shown to be related to motivation and successful training performance (Colquitt, et al, 2000, Fisher & Ford, 1998), the current study examined whether generalized self-efficacy accounted for unique variance in training performance beyond training-specific self-efficacy.

In general, the results of the current study show little support for the hypotheses regarding generalized self-efficacy. One possible explanation for the lack of a significant relationship between generalized efficacy and training process variables may, somewhat ironically, be the presentation of feedback about one’s performance. By receiving specific feedback about one’s performance, task-specific efficacy is likely established and may supersede one’s general sense of capability. In social cognitive career theory (SCCT; Lent, Brown, & Hacket, 1994), one’s performance accomplishments, or how well one performs on a task, drives efficacy for career fields related to that task. As the
individual pursues a chosen career and is faced with additional instances where performance is required and feedback is received (both from the self and others), this additional information feeds back into and has the possibility of altering the individual’s sense of efficacy. Previous feelings of efficacy may therefore be reinforced, strengthened, or weakened. Similarly, in the current study, for those participants where a time 1 and time 2 measure of efficacy was available, task-specific efficacy decreased for those receiving negative feedback and increased for those receiving positive feedback. This indicates that task-specific efficacy had been established, and, therefore, one’s general sense of capability (much like early task-specific efficacy in SCCT) may have been less relevant to motivation, time, and effort after receiving feedback. It may be that generalized self-efficacy serves as a better indicator of one’s motivation to first attempt a novel task, but once specific feedback about task performance is given, one’s general sense of capability does not predict further training-related processes.

Given that the direct effect of generalized efficacy on motivation and time on task in the model were not significant, it was not surprising that the tests of mediation between general efficacy and performance were also non-significant. Interestingly, generalized efficacy was only significant directly related to training performance for men. In the positive feedback condition, generalized efficacy was positively related to time 2 training performance ($r = .48, p < .01$). However, generalized self-efficacy was negatively related to time 2 training performance ($r = -.53, p < .01$) in the negative feedback condition. The positive relationship in the positive condition, although not specifically hypothesized, was expected as a function of the mediation hypothesis. The finding of a negative
relationship between efficacy and performance for men in the negative feedback condition, however, was surprising and unexpected.

One explanation for the opposing relationships between generalized efficacy and performance among men may be related to men’s overconfidence in their ability in the negative feedback condition. The strong negative relationship between mental ability and generalized efficacy ($r = -.48, p < .01$) and mental ability and training self-efficacy ($r = -.48, p < .01$) in the negative feedback condition may indicate that those with lower mental ability overestimated their performance capabilities. Previous research supports the idea that less-skilled individuals tend to overestimate their ability, while those with greater skill tend to have more realistic perceptions of their capabilities (Kruger & Dunning, 1999).

Additionally, stereotypes about driving may help explain men’s overconfidence, as well as differences between men and women in the efficacy-performance relationship. Participants were made aware of the nature of the training (ambulance driver training) before the study commenced. As such, the knowledge that the training included learning how to drive an ambulance may have triggered stereotypes surrounding driving. A prominent cultural stereotype in the United States regarding driving is that men tend to be more proficient drivers than women (Kunda, 1999). As such, this stereotype may have impacted the relationship between generalized efficacy and performance in a way that negatively affected women, and potentially positively affected men.

Another explanation for the lack of relationship between generalized efficacy and training process variables could be that broader or more global constructs such as general self-efficacy or personality are less indicative of task-specific motivation. Ajzen’s (1991)
theory of planned behavior argues that attitudes, norms, and perceived control predict one’s intentions to perform a behavior, and, in turn, one’s intentions predict one’s actual behavior. Research that has utilized Azjen’s theory has generally found support for this contention, primarily when the level of specificity in the attitudes, norms, perceived control, intentions, and behavior are similar. When more global attitudes and norms are used to predict specific intentions and behavior, the connection can be weak or nonexistent (Sutton, 1998). A parallel argument exists in the selection literature, as researchers have had difficulty finding a strong link between the broad Big Five personality factors and job performance (Barrick & Mount, 1991). For example, although a theoretical and logical connection exists between conscientiousness and job performance, these variables are often measured at different levels of specificity in terms of behaviors, thus potentially leading to smaller observed relationships.

It was clear from the results that overall, generalized efficacy did not predict training process variables above and beyond training self-efficacy. The one exception to this was the finding in the positive condition that generalized self-efficacy accounted for incremental variance above and beyond training self-efficacy in the prediction of motivation to learn. However, the 5% increase in variance accounted for by generalized self-efficacy was fairly small and occurred solely in the positive feedback condition.

Overall, generalized efficacy demonstrated little relation to training process variables and training performance. Although a first look at the effects of generalized efficacy in a multistage training environment where feedback is given, the findings appear to indicate generalized self-efficacy does not function as a resilience variable to poor early training performance. As previously suggested, it may be that generalized self-
efficacy best relates to pre-task states, but during the task, other processes may supersede the effect of one’s general capability. More broadly, the current findings seem to indicate that the traditional training model (Colquitt et al., 2000) holds well compared to the model of generalized self-efficacy functions as resilience to negative feedback.

**Goal Orientation**

Extant research on goal pursuit generally supports two types or classes of goals: learning goals and performance goals (Button et. al., 1996; DeShon & Gillespie, 2006; Dweck & Leggett, 1988; Elliot & Church, 1997; VandeWalle, 1997). Those adopting a learning orientation tend to have a mastery focus such that they strive to increase their level of competence or understanding of material and generally believe that task success is determined by effort (Duda & Nicholls, 1992). Those adopting a performance orientation are more concerned with demonstrating proficiency in order to gain positive evaluation from others and believe that ability leads to goal completion.

Additionally, these two approaches to goal pursuit often result in different patterns of behavior during goal striving. Learning-oriented individuals often seek challenge, are not deterred by failure, and may be more likely to experiment with new strategies in order to master material (Davis, Carson, Ammeter, & Treadway, 2005). Alternatively, performance-oriented persons tend to demonstrate maladaptive or helpless response patterns during learning. These response patterns can include avoiding challenging tasks, decreased task performance (Dweck & Leggett, 1988), and negative self-thoughts that shift attention away from task performance and strategy adjustment.

Applying these differences in goal pursuit to a computer-based training situation, it was hypothesized for the current study that goal pursuit would be an important
predictor of motivational process and performance in a multistage training situation. More specifically, differential effects were expected depending on whether trainees received positive or negative feedback. For mastery orientation, it was predicted that those adopting this goal orientation would have higher levels of the training process variables (motivation, time on task, task effort), and that these process variables would mediate the relationship between mastery orientation and training performance. Alternatively, it was suggested that the relationship between performance orientation (approach and avoid) and the training process variables would be moderated by the type of feedback received after the first stage of training. In both cases (approach and avoid) it was expected that the relationship between performance orientation and training process variables would be stronger in the negative feedback condition (see Figure 3 and Figure 4). Finally, it was also hypothesized that training process variables would mediate the relationship between performance orientation and training performance.

In general, the hypothesized relationships were not supported. Mastery orientation and performance approach orientation had small but non-significant relationships with the training process variables and no direct relationship with training performance. Also, performance avoid orientation had a non-significant relationship with motivation to learn and an unexpected significant positive relationship to time on task in the negative feedback condition. Given these results, it follows that the training process variables did not significantly mediate the relationship between mastery orientation and training performance. Finally, the expected interaction effects for performance approach orientation and performance avoid orientation with feedback and training process variables were also non-significant.
One explanation for these findings may be related to the goals that trainees set during the training. Much of the research around goal orientation has provided learners with specific goals (Phillips & Gully, 1997). However, in the current study, trainees were not given a particular goal, so trainees may have set performance goals for themselves. Phillips and Gully found that the effect of learning orientation is mediated by one’s self-set goals. In the current study, the goals trainees set for themselves may have mediated the relationship between learning orientation and training process variables. Unfortunately, trainees’ self-set goals were not examined in the current study. Future research including these may help to clarify the relationships between learning orientation and motivation. Also, given that trainees received feedback, it may be very informative to see how self-set goals change from pre-training to post-feedback.

One of the more surprising findings regarding learning orientation was the significant positive relationship between performance avoid orientation and time on task in the negative feedback conditions. Based on the ability attributions of those adopting a performance avoid orientation (Dweck, Hong, & Chiu, 1993) and the task disengagement that has been found to accompany this attribution, it was expected that those adopting a performance avoid orientation would spend less time on the training task after receiving negative feedback. However, it was found that those in the negative feedback condition who held a performance avoid orientation spent more time on the training task. This counterintuitive finding is puzzling and not easily explained.

Another explanation for the current findings may be due to the moderate levels of multicolinearity among the goal orientation variables. As seen in Tables 4-6, mastery orientation, performance approach, and performance avoid were moderately interrelated.
In addition to their interrelation with each other, these variables were also moderately related to the other independent variables as well. This may help explain the reduced unique relationships between the IVs and the mediating variables in the model. It also suggests that these variables may be subcomponents of an overarching construct. This possibility will be discussed further in a subsequent section.

Similar to generalized self-efficacy, another interpretation of these findings suggests that learning orientation at a dispositional level may be less informative in predicting more task-specific motivation in a training context (Sutton, 1998), especially after receiving feedback about one’s performance. Learning goal orientation may better predict one’s motivation to engage and learn new work-related material in general, but it may be less related to a specific instance of learning new work-related skills. Given that studies have found a relationship between learning goal orientation and pre-training measures of efficacy and motivation (DeShon & Gillespie, 2006), it may be that the pre-training stage is where we would expect to find a stronger link, before trainees gain a sense of their performance in the training from feedback. Once engaged in the training and having received feedback, other more specific processes such as emotional reactions, goal setting, or learning strategy adaptation (Brown, 2001) may better explain motivational process throughout the training.

A final explanation is simply that an alternative training model for trainees, where goal orientation functions as a resilience variable for trainees who perform poorly in early stages of training, may not be needed. In general, the current model seems to suggest that those with higher levels of general cognitive ability, those more motivated to learn, and those willing to spend more time learning the task (especially women in this study) are
likely to do well in training regardless of their general learning orientation. Although previous research has linked learning orientation to the training process, it had generally been predictive of pre-training efficacy and motivation and, given the results of the current study, seems better suited as a more distal indicator of general performance and motivation versus providing a buffer to receiving negative feedback during a given training session.

*Optimism*

Optimism represents one’s general expectations about life outcomes. Optimists tend to expect things to go their way and expect good things rather than bad to occur, whereas pessimists generally expect negative outcomes and events to occur. These expectancies about life events are believed to operate within a general model of self-regulation (Scheier & Carver, 1985) where a discrepancy between one’s current state and desired goal state may lead to the expenditure of resources aimed at reducing the discrepancy. The recognition of barriers in reducing this discrepancy leads to an assessment of outcome expectations. At this point, optimists will generally evaluate barriers as being surmountable, and thus continue to engage in behavior aimed at reducing the discrepancy between the current and goal state, while pessimists are likely to believe that goal obstacles are impassable, and thus avoid or disengage from goal pursuit.

Given the general positive outcomes optimists expect, it was hypothesized in the current study that optimists would demonstrate higher levels of the training process variables (motivation to learn, time on task, and task effort), that training process variables would mediate the relationship between optimism and training performance, and that there would be an interaction such that the relationship between optimism and
the training process variables would be stronger for those receiving negative feedback about their early stage training performance.

As seen in the path models, optimism was not a significant predictor of either motivation to learn or time spent on task in the positive or negative feedback conditions. One possible explanation for these findings is that although optimism may be linked to motivation when first starting a task, after being engaged in the task and receiving feedback about one’s progress, the relationship may change. For example, in the positive feedback condition, those higher in optimism would have had their expectations confirmed, and from a self-regulation perspective might have experienced a decrease in motivation, as optimists would have perceived a reduction in the discrepancy between their current and goal states (Carver & Scheier, 2001). This re-evaluation of goal pursuit could have reduced the overall relationship between optimism and the training process variables, since there was now a smaller discrepancy between one’s current and goal state. In the negative feedback condition, optimists also may have re-evaluated their current versus desired state, but instead of believing more effort and motivation would lead to performance, they may have re-evaluated the overall importance of the goal itself. Given that the participants were not actually job trainees, their goal may have changed from successfully learning the training material to successfully completing the study.

Another possible explanation for the current findings is that a state analogue for optimism may exist. Seligman (1991) noted that in some circumstances even those with the strongest optimism may be temporarily pessimistic and vice versa. As such, finding out one scored poorly in the first portion of a training exercise may have resulted in a temporary state shift. As a result, levels of motivation and effort and time on task may
have changed. Given that time one training process data was not collected in the current study, future studies that examine changes in motivation and effort throughout the training process may better explicate the link between resilience variables and the training process.

Similar to the findings for the other resilience variables, one possible explanation for a lack of relationship is the level of specificity between optimism and the outcome variables. Like the other resilience variables, optimism represents a more broad personality type variable that may only be clearly linked to more general behaviors. As mentioned previously, optimism has been linked to greater acceptance of and resilience during an organizational change process (Judge et al., 1999). The organizational change process differs from training, however, in level of specificity. Organizational change generally occurs over a longer time period (especially compared to computer-based training) and likely involves a greater degree of ambiguity and uncertainty. As such, variables like optimism may better indicate resilience during this more general change process than in the more task-specific training situation.

One final possible explanation for the findings is that optimism may simply not be related to employee training, and, therefore, a model where optimism functions as a resilience variable to negative feedback may be unwarranted. No study to date had directly examined how optimism impacts training, and the current study results indicate it may have little or no impact. The optimism research has generally focused on resiliency to illness or general life stress (Bedi & Brown, 2005; Carver et al., 1993), but it has been less examined for work outcomes. As such, it is possible that optimism may not be
strongly related to a specific training occurrence but, rather, more related to a broader approach to training for a job in general.

*Locus of Control*

Locus of control is a trait variable that describes beliefs about the power one has over various events (Lau & Woodman, 1995; Newton & Keenan, 1990; Rotter, 1966). Individuals with a strong internal locus of control believe that they exert personal control over their environment, while those with an external locus of control believe that events affecting them are largely controlled by external forces such as powerful others, luck, chance, fate, etc. Research on locus of control as a resiliency variable has generally focused on coping skills. Those who perceive personal control over their environment are better able to cope with stress, since personal control can empower one to directly deal with or change the stressor. Those with an external locus, however, would perceive the stressor as something out of their control and thus be unable to alter the impact of the stressor (Newton & Keenan, 1990).

Given the sense of control internally locused individuals perceive, it was hypothesized in the current study that an internal locus of control would correspond with higher levels of the training process variables (motivation to learn, time on task, and task effort), that training process variables would mediate the relationship between locus of control and training performance, and that there would be an interaction such that the relationship between locus of control and the training process variables would be stronger for those receiving negative feedback about their early stage training performance.

Only one result partially supported the study hypotheses. As expected, locus of control was positively related to time on task in the negative feedback condition. Those
individuals who were internally locused spent more time on the training after receiving negative feedback than those externally locused. This finding is in-line with the resilience argument and suggests that locus of control may indeed serve as a buffer against negative feedback during training. Unfortunately however this was only found to impact time spent on task and not reported motivation to learn during the second task. One explanation for this may be that more internally locussed participants may not have reported higher levels of motivation, but their behavior indicated they were more motivated as they spent more time on the second training task. It may be that the effects of negative feedback are to reduce reported motivation due to an emotional letdown from poor performance, but higher motivation is evidenced by greater time spent on task. More research is needed however to ascertain the viability of this explanation.

Interestingly, the relationship between locus of control and time on task was negative in the positive feedback condition, indicating that internally locused trainees spent less time on the training after receiving positive feedback. One possible explanation for this finding is that internals may have expected to do well given their general optimistic outlook as locus of control was positively correlated with optimism for those in the positive feedback condition, and thus they spent less time on the second training task. Additionally, from a control theory perspective (Carver & Sheier, 2001), internals may have experienced a reduction in motivation as they knew they were performing well. A coasting effect may have occurred that lead to less time spent on the task. Externals, on the other hand, may also have been surprised to receive positive feedback given their general pessimistic outlook. Interestingly, once having received positive feedback, they may have been more motivated to keep doing well in the training, since externals also
tend to adopt a performance avoid learning orientation ($r = -.23, p < .05$). These findings for locus of control and feedback raise interesting questions about the nature of reported versus behavioral indicators of motivation and how feedback may impact both. Also, while the resilience model was largely unsupported by the data in this study, it does appear that future research studying the change in motivation during training and the link to locus of control is warranted and may prove fruitful.

Another explanation for the findings regarding locus of control may be the broader dispositional nature of the variable. Like the other resilience variables, locus of control is thought to represent a broader personality variable that indicates one’s general sense of control. However, the training task was fairly specific in nature, and, as such, locus of control may be limited in its predictive power in such a situation (Sutton, 1998). In fact, it may be that locus of control is linked to training more broadly. For example, internally locused individuals may have more positive attitudes towards training in general and may report being more motivated to learn training material for a job compared to externals, but in a specific training situation the relationships may not be as clear. Like general efficacy or optimism, an internal locus of control may better indicate pre-training states, but more task-specific states/variables may better explain motivational process, training performance, or resilience to negative feedback once trainees engage in a training program. Most of the training literature has examined individual difference variables as exerting their influence prior to the commencement of training (Colquitt et al., 2000); thus, it may be that these more distal variables have little or no direct impact on processes that occur during the training. Clearly, more research is needed to verify
this, as well as to identify what other factors impact the training process across multiple stages of learning.

The learner control literature offers some additional insight into the findings of the current study. Learner control refers to the extent to which learners are able to actively control the learning process (Williams & Zahed, 1996). For example, within computer-based training programs, the level of learner control can range from highly prescribed (where learners have little control over the learning process) to highly flexible (where learners have a great deal of control). Training material is presented to the learner via a computer or the Internet, and the learner may have little or a great deal of influence over what information is covered, the order in which it is presented, or whether information can be repeated (Brown, 2001). In the current study, learners had a fair amount of control over their learning in that they could choose the order in which to view various modules of the training material, and they could repeat any of the modules at any time. In this environment, one would suspect that an internal locus of control would be a stronger predictor of motivation and training success. However, as seen in the results, those with an external locus had higher levels of motivation to learn the training material.

One reason for this could be that even though the training environment allowed for a fair amount of control, the trainees may have been unaware of the control available to them. Throughout the study, most trainees proceeded through the modules in the order they appeared on the screen. Few trainees deviated from the presented module structure, and even fewer reviewed modules more than once. This may indicate that trainees did not have a strong sense of control over their learning. This lack of perceived control may have been detrimental to trainees with an internal locus. These learners may have been
less motivated because they generally expect to have control over situations, but they may have felt they had little control over outcomes in the training situation. Additional, the laboratory setting of the study may have further contributed to reduced control perceptions. Trainees may have believed that the results of their training were really under the control of the researcher in the room, and this may have had a negative impact on internally locused individuals.

Finally, it may be that locus of control does not function as a resilience variable to negative feedback in computer-based multistage training. It may be that the traditional training model holds well for both learners who excel in early stages of training and for those who perform poorly. Individual difference variables and general cognitive ability may predict motivation and performance similarly well for both types of trainees, and therefore a new training model that specifies differential relationships for good and poor performers may provide limited utility.

*Control Variables*

By far the most powerful predictor of training performance was general cognitive ability. This finding supports a vast body of previous training literature that has demonstrated a strong link between general cognitive ability and training performance (Byrnes, 1995; Holladay & Quinones, 2003; Hunter, 1986; Hunter & Hunter, 1984; Ree & Earles, 1991, Schmidt & Hunter, 1992; Wonderlic, 2002). Additionally, that general cognitive ability was related to performance lends evidence to the validity of the performance measure used in the current study. A lack of relationship between general ability and the performance measure would likely mean that the performance test did not adequately represent what trainees learned in the training.
Additionally, given the results of the current study, one interesting question is whether general cognitive ability alone explains differences in training process variables and performance across the experimental conditions. One counter argument to the hypotheses in the current study is that cognitive ability may be the only important predictor of success in later stages of training for those who performed poorly early on. The results of the current study seem to suggest that although general metal ability was an important indicator of performance in the negative feedback condition, training process variables still had an impact on performance. Interestingly, in the analyses for women, cognitive ability had a much stronger relationship in the positive feedback condition. It may be that for those trainees who did well in early stages of training, their motivation declined, and thus the trainees’ performance was purely a function of ability. This presents a potentially precarious situation. For trainees with less ability who do well in an early training stage, entering a “coasting” mode (Carver & Scheier, 2001) where they rely on their ability could potentially result in a decline in later performance. Future research examining this possibility could help clarify the effects of receiving negative performance feedback during the training process.

Computer anxiety had only a minor impact in the current study. Most notable was the significant negative relationship between computer anxiety and general mental ability in the positive feedback condition (the relationship was not significant in the negative feedback condition). Based on further inspection of the data, it appears that this may have been due to the distribution of computer anxiety in the positive feedback condition. The distribution was more positively skewed in the positive feedback condition, and after
removing some of the more extreme values, the correlation fell to non-significant levels. Overall, computer anxiety had only negligible effects in the current study.  

Task Specific Efficacy

One interesting finding from the additional analyses was that task specific efficacy changed over time. In the positive feedback group, task efficacy significantly increased after the feedback was presented, and for the negative feedback group, task specific efficacy significantly decreased after the feedback was presented. These findings suggest that the manipulation was effective and that trainees believed they performed as told. Additional analysis of task efficacy showed that this may be linked to the relationship between time on task and performance, however these results must be interpreted with caution though as the sample size for this analysis was small. It does seem that based on these findings future research examining the change in task specific efficacy during the training process may be fruitful.

While the current study proposed that generalized self-efficacy would have an impact on training variables above and beyond task specific efficacy, the results clearly demonstrated this effect did not occur. In fact, additional analysis showed that task specific efficacy significantly affected time spent working on the training task, and that the relationship between task efficacy and performance was mediated by time on task in the negative feedback condition. As previous research has shown that task efficacy influences training performance and process variables (Colquitt et al., 2000), this finding is not surprising in the current study. Interestingly, the effect functioned such that higher levels of task efficacy were associated with less time spent on the task. In turn, less time spent on the task was associated with lower training performance. This finding implies
that after receiving negative feedback, those with higher levels of task efficacy may have overestimated their ability to perform well in the second stage of training as they spent less time on task and had lower level of performance.

Another implication from findings regarding task specific efficacy is that training for a particular job skill may be too strong of a situation for broader dispositional variables to exert a strong effect. As seen in the results of the study, generalized efficacy, learning orientation, and optimism had nearly no impact on training process variables. Thus, it may be that future research should focus on training or task specific process and more proximal variables that are likely to impact the training process. Another possible direction for future research would be to understand if more proximal variables like task efficacy mediate the relationship between more distal dispositional variables and training process variables and outcomes. The current data did not support this hypothesis, however sample sizes were limited and the design may need modification in order to better test this assumption.

**Resilience**

Although the resilience variables in the current study had little relation to the training process variables, exploratory analysis did suggest that the resilience variables themselves are very interrelated and, in fact, appear to be better conceptualized as subcomponents of a higher-order construct (See Figure 20). Factor analysis results revealed that generalized self-efficacy, optimism, mastery orientation, and locus of control all loaded on a single higher-order factor that could be conceptualized as resilience. Each of the factors loaded at .50 or higher, and the model fit indices indicated good fit for the overall model.
These findings support the research of Judge et al. (1999), who found that locus of control, positive affectivity, self-esteem, and generalized self-efficacy loaded into a higher-order factor, and this factor was predictive of coping with organizational change. Similarly, Erez and Judge (2001) found that locus of control, neuroticism, self esteem, and generalized self-efficacy loaded well on a higher-order factor referred to as core self-evaluations, and, in turn core self-evaluations were predictive of pre-task motivation for an anagram task, goal-setting motivation for insurance sales agents, and productivity/performance. Further research (Judge, Bono, Erez, & Locke, 2005) demonstrated that core self-evaluations were predictive of self-concordant goals (goals that match one’s enduring interests and values) and self-concordant goal pursuit. Also, recent research by Tsaousis, Nikolaou, Serdaris, & Judge (2007) found a link between core-self evaluations, subjective well-being, and physical/mental health.

Taken together, the findings around core self-evaluations, coupled with the findings of the current study, seem to suggest that resilience-like variables do fit well into a higher-order model, and this higher-order model is predictive of other more broad variables such as organizational change, self-congruent goals, and well-being, as well as pre-task levels of motivation. However, these higher-order variables have yet to be seen as effective predictors of more task-specific behaviors, especially after receiving feedback regarding one’s performance on the task. Therefore, resilience-like variables may be most useful in understanding pre-training or pre-task states, but other variables better explain reactions to feedback and continued/sustained motivation throughout the training process. Future research adopting a design capable of distinguishing these effects
may provide more clarity regarding the effects of dispositional resilience variables in a multistage training process where regular feedback occurs.

Limitations and Future Directions

There are a number of potential limitations to this study and issues to consider when conducting future CBT research. The first limitation deals with the design of the study. As mentioned previously, the effect of dispositional variables in a training situation have generally been examined as distal predictors of pre-training variables and, as such, may only exert their effect early on in the training process. The current study hypothesized that, given the nature of the selected dispositional variables (as resilience variables), an effect would be seen in later stages of the training situation. Therefore, motivation and effort were only measured after feedback regarding stage one training performance was given. It may be, however, that the dispositional variables measured in this study have their primary effect on levels of trainee motivation and effort prior to receiving feedback about their performance, or, in other words, time 1 motivation/effort. Had pre-training levels of these variables been assessed, the impact may have been seen at that stage of the training, and then the change in these levels and the impact of the dispositional variables on any change in motivation could have been examined.

Another design limitation is that training performance was only measured immediately following the training session. One consideration is how well trainees retain the information over a longer time period and how well they are able to transfer what they learned to the job (Kirkman, Rosen, Tesluk, & Gibson, 2006). It could be that although motivation and immediate task performance were not impacted by resilience, resiliency might be linked to longer-term retention of the material or transfer of the
training to the workplace. Given the design of the current study, these questions could not be addressed. However, future research could examine these factors to determine if resiliency is related to retention or transfer of training material.

A second limitation deals with the feedback that was given to participants. Kluger and DeNisi (1996) note that feedback may have differing effects depending on the level of the feedback given. These authors suggest a hierarchy such that feedback can be directed at a meta level (how tasks are related to the self and other self goals), at a task motivational level (e.g., task performance across trials) that is focused within the specific task, or at a task learning process level (e.g., detailed feedback indicating the correct answer), and that the level at which feedback is given will lead to differential outcomes regarding motivation and performance. For example, their meta analytic data showed that feedback given at the meta level tended to attenuate the positive effects feedback can have on motivation and performance, while feedback aimed at lower levels generally resulted in positive results when providing feedback. The authors suggest that at higher levels, attention is shifted to the self, where at lower levels, attention stays with the task and a clearer discrepancy between current state and goal state emerges. This clarity of goal discrepancy leads to more positive outcomes, where focus on the self draws attention away from the task and thus hinders further task progress.

In the current study, although not designed to be aimed at one of the levels described by Kluger and DeNisi (1996), it may be that some trainees perceived the feedback as aimed at a meta level, while others interpreted the feedback at one of the task levels. As such, this inconsistency in feedback perception may have impacted the ability to detect whether the resilience variables impacted training process variables. Future
research manipulating the feedback level given could help to determine if the impact of resilience on training process variables depends on the level of the feedback that is given.

Another limitation of the current study may be the setting in which the study took place. Although the laboratory setting provided the research with a great deal of control over the conditions of the experiment, it may be that computer-based training research is best studied in a field setting. First, participants were not free to complete the training at any time, as they likely would be able to do as an employee (Welsh et al., 2003). Also, many employees are able to access training via the Web, and a future study that presents the training through the Internet may provide a more realistic training scenario. Additionally, because this was a laboratory study that relied on undergraduate students, there may not have been as strong of an investment in the training as would be seen by real employees. The results showed that motivation was normally distributed and centered around the neutral point of the scale, indicating that some participants were motivated and others were not. However, in an employment situation where the outcome of the training has a significant impact on the trainee, there may have been greater investment in the training, and this may have impacted the results.

One interesting future direction to consider is whether the proposed model functions similarly for men and women. While not a target of the current study, the examination of results by gender do suggest that the process by which men and women respond to training feedback may be different. While there were few mean level differences between men and women on pre training variables, nor on study outcome variables, the relationships between variables do appear to be different between men and women. Thus the process by which men and women are motivated to train and how
feedback impacts this motivation may be different. A more detailed analysis was not feasible for this study, but future endeavors to explore this possibility seem warranted.

Another factor to consider for future research is the measurement of emotions during the training process, especially when presenting feedback. One implication of providing positive or negative feedback to trainees is that trainees may have a positive or negative emotional response. It may be that these emotional responses help explain how resilience variables impact motivation and performance in a training context. Affective events theory (AET) (Weiss & Cropanzano, 1996) supports this proposition in that it suggests that work events, such as receiving feedback, will trigger an affective response, and, in turn, this response will impact future work attitudes and behavior.

One way to understand how emotional reactions to work events translate to behavior is through the circumplex model of emotions (Posner, Russell, & Peterson, 2005), which presents emotions as existing on a circle divided into four quadrants via two dimensional axes. The first axis represents the pleasantness dimension, with pleasant and unpleasant representing opposite ends of the axis. The second axis, activation, represents the intensity or physical state of the emotion and ranges from activation at one end to deactivation on the other. Emotions such as happy and excited are found in the quadrant bounded by pleasant and activation, while emotions such as depressed and bored are bounded by the deactivation and unpleasant ends of the axes. The Positive Affectivity Negative Affectivity Scale (PANAS) (Watson, Clark, & Tellegen, 1988) measures affect as presented on the circumplex. Watson et al. note that those with higher (lower) levels of negative affectivity (NA) are more (less) sensitive to receiving negative information while those high (low) in positive affectivity are more (less) sensitive to receiving
positive information. It may be, then, that resilience to negative feedback is more important for those high in NA and, therefore, including measures of affectivity in future studies is warranted.

A final thought for future directions comes from the literature on learning strategies (Bostrom & Lassen, 2006; Hellertz, 1999) The research in this area suggests that learners in a self-directed learning environment such as computer-based learning may choose a number of different learning strategies available to them, and these strategies vary in their effectiveness. Learner strategies may include listening, questioning, thinking, reading, note taking, and others, and a number of factors can impact which strategies learners adopt (Hellertz, 1999). It may be, then, that resilience to feedback in a training environment is linked to learning strategy choice, and it is this choice that has a great impact on performance. Some learners may adopt more successful learning strategies based on their coping skills and resources in the face of negative information, while other learners choose poor learning strategies because cognitive resources have been shifted to coping with the negative information. Also linked to learning strategy is one’s meta cognitive ability (Bostrom & Lassom, 2006; Schmidt & Ford, 2003). Meta cognition represents one’s ability to monitor their own learning progress, identify problems, and adjust their learning appropriately. Research has demonstrated that meta-cognitive activity is linked to successful performance in computer-based learning situations, and, thus, may play an important role in understanding how resilience to feedback ties into motivation and performance.
Conclusions

As industry reports indicate, the distribution of training through computer software and the Internet is growing at a rapid pace, and, therefore, it is crucial that research investigates the impact this will have for learners. This study attempted to take a first step by examining the factors related to motivation and performance in a multistage computer training environment where trainees received feedback regarding their learning during the training. It was proposed that a number of dispositional variables would function as buffers for trainees receiving negative feedback about their performance, and that these buffers would translate to higher levels of task motivation and overall training performance.

Results from the 197 participants who took part in the study indicated that further research is needed to understand how resilience variables impact training in a multistage computer environment. Although the results largely confirm the effects that cognitive ability and motivation have on training performance, it seems that resilience variables as defined in the current study have little impact on motivation and performance, even after receiving negative feedback about early stage learning. Further investigation regarding these hypotheses is warranted, however, since dispositional variables clearly impact the training process (Colquitt et al, 2000) and only a handful of studies have examined resiliency to negative performance feedback in a computerized training environment.
CHAPTER VI

SUMMARY

The rapid advancement of computer technology and the increase of Internet access to employees have had a dramatic impact on employee training and development practices (Brown and Ford, 2002, Welsh et al., 2003). More and more organizations are making the jump from traditional classroom-based training to an E-learning environment and must therefore see the advantages of E-learning (such as rapid deployment, anytime access, self-paced learning, improved performance, etc.) as outweighing E-learning’s potential drawbacks (lack of social context, high implementation cost, potentially complex learning environment). And as the adoption of technology has grown, so has the number of practitioner-focused books, articles, and technical reports dealing with E-learning (Welsh et al.). Only recently has there been a surge in the research literature around E-learning, but the majority of this work has focused more on the technological aspects and design of the training, whereas less attention has been focused on learner traits that influence the training process. This study has attempted to add to the E-learning literature by examining the effect of individual difference variables in an E-learning environment.

Specifically, the current study investigated whether a number of individual difference variables (generalized self-efficacy, learning orientation, optimism, and locus
of control) functioned as resilience variables to negative feedback in a multistage E-learning module. Feedback was manipulated so that half of the trainees in the ambulance driver training program received positive feedback about their module 1 training performance, while the other half of the trainees received negative feedback about their module 1 training performance. This resulted in a two-cell design where the effects of resilience variables on feedback could be examined experimentally. One-hundred and ninety eight participants completed a professionally developed CD-ROM E-learning module, which was adapted for research purposes. Additionally, participants completed a number of additional variables that assessed resiliency (generalized self-efficacy, learning orientation, optimism, and locus of control), training performance, motivation, effort, time on task, general mental ability, self-efficacy, and computer anxiety.

Hypotheses were tested through the examination of correlations and the testing of latent path models. The results revealed that the proposed resilience variables had little relation to training process variables (motivation, effort, time on task) or training performance in either the positive or negative feedback conditions. Only locus of control and performance avoid orientation were significantly related to training process variables; however, the direction of these relationships were opposite of what was expected. Tests for mediation revealed that training process variables did not mediate the relationships between resilience variables and training performance. Furthermore, analyses showed little difference in the relationships across experimental conditions. Interestingly, the results of this study appear to support the training model proposed by Colquitt et al. (2000), in that training process variables were, in general, related to training performance, and, as seen in numerous previous studies (Byrnes, 1995; Holladay & Quinones, 2003;
Hunter, 1986; Hunter & Hunter, 1984; Ree & Earles, 1991, Schmidt & Hunter, 1992; Wonderlic, 2002), general mental ability was highly related to training performance. Based on these findings, it appears that a new training model that delineates different processes for trainees who receive positive versus negative feedback may be premature.

There are a number of contributions that this study makes to the E-learning literature. First, this was the first empirical study that attempted to examine the impact of resilience variables in an E-learning environment where learners received either positive or negative feedback regarding their performance in an early leaning stage. The use of feedback in an E-learning setting attempted to provide a realistic experience for what may occur in E-learning environments that trainees in organizations participate in. Trainees who engage in E-learning may perform poorly in training, and, therefore, may need a buffer against this feedback to maintain motivation and effort during further training. Although little support was found for the hypothesized relationships in the current study, this study laid a foundation upon which future E-learning research can be based.

Additionally, this study provided initial evidence that the general training model proposed by Colquitt et al. (2000) may be applicable to the E-learning environment and models that propose differential effects for trainees based on feedback received may be unwarranted. One important outcome of these findings, therefore, is parsimony. Confirming the fit of a model is only one aspect to model testing. Testing competing or alternative models also provides further evidence of the appropriateness of one’s original model. Although not a direct goal of this study, one outcome seems to be the support of Colquitt et al.’s model. The current study proposed a new model, and while the results
revealed little support for the new model, the findings did generally support Colquitt et al.’s training model. Therefore, the results of this study may be seen as ruling out an alternative model to Colquitt et al.’s model, and this is an important step in model development and theory testing.

Another contribution comes from the support of the higher-order resilience model. Although resiliency appears unrelated to the training process based on the current study findings, the results do seem to support a higher-order resiliency model that other research also supports (Judge et al., 2005; Ioannis et al., 2007). It seems that resilience as conceptualized in this study and in others may be an important indicator of more global processes, such as organizational change, job satisfaction, or long-term health than more task-specific processes such as an E-learning training module. Clearly, further research is needed to understand the structure of resilience, as well as whether other variables fit into the proposed higher-order model.

Overall, it is clear that the use of E-learning is on the rise, yet the investigation of factors that impact E-learning has only recently commenced. Indeed, it is important that research continues to examine not only the E-learning process but what factors may have an impact on leaning in this environment. The results of the current study can be advanced in multiple ways to enhance the understanding of such factors. Research that includes the effect that emotions may have in the training process may elucidate more specific reactions to feedback and changes in the training process. Additionally, examining resilience in an applied setting may reveal information about the training process that could not be captured in the laboratory environment. Hopefully future
research can build and expand on the current study to ensure that both organizations and learners maximize the utility and effectiveness of E-learning.
REFERENCES


APPENDIX A

GENERALIZED SELF-EFFICACY QUESTIONNAIRE

Schwarzer & Jerusalem (1995)

Instructions: Next you will see statements dealing with your feelings about yourself. Please choose the extent to which you agree or disagree with these statements.

1. I can always manage to solve difficult problems if I try hard enough.

   1
   Strongly Disagree

   2
   Disagree

   3
   Neutral

   4
   Agree

   5
   Strongly Agree

2. If someone opposes me, I can find the means and ways to get what I want.

   1
   Strongly Disagree

   2
   Disagree

   3
   Neutral

   4
   Agree

   5
   Strongly Agree

3. It is easy for me to stick to my aims and accomplish my goals.

   1
   Strongly Disagree

   2
   Disagree

   3
   Neutral

   4
   Agree

   5
   Strongly Agree

4. I am confident that I could deal efficiently with unexpected events.

   1
   Strongly Disagree

   2
   Disagree

   3
   Neutral

   4
   Agree

   5
   Strongly Agree

5. Thanks to my resourcefulness, I know how to handle unforeseen situations.

   1
   Strongly Disagree

   2
   Disagree

   3
   Neutral

   4
   Agree

   5
   Strongly Agree
6. I can solve most problems if I invest the necessary effort.

   1 Strongly Disagree  2 Disagree  3 Neutral  4 Agree  5 Strongly Agree

7. I can remain calm when facing difficulties because I can rely on my coping abilities.

   1 Strongly Disagree  2 Disagree  3 Neutral  4 Agree  5 Strongly Agree

8. When I am confronted with a problem, I can usually find several solutions.

   1 Strongly Disagree  2 Disagree  3 Neutral  4 Agree  5 Strongly Agree

9. If I am in trouble, I can usually think of a solution.

   1 Strongly Disagree  2 Disagree  3 Neutral  4 Agree  5 Strongly Agree

10. I can usually handle whatever comes my way.

    1 Strongly Disagree  2 Disagree  3 Neutral  4 Agree  5 Strongly Agree
APPENDIX B

LOCUS OF CONTROL

Nowicki & Duke, (1973)

Instructions: Please read the following questions and respond either “Yes” or “No” to each.

1. Do you believe that most problems will solve themselves if you don’t fool with them?
   
   Yes  No

2. Do you believe that you can stop yourself from catching a cold?
   
   Yes  No

3. Are some people just born lucky?
   
   Yes  No

4. Most of the time, did you feel that getting good grades meant a great deal to you?
   
   Yes  No

5. Are you often blamed for things that just aren’t your fault?
   
   Yes  No

6. Do you believe that if somebody studies hard enough, he or she can pass any subject?
   
   Yes  No

7. Do you feel that most of the time it doesn’t pay to try hard because things never turn out right anyway?
   
   Yes  No
8. Do you feel that if things start out well in the morning that it’s going to be a great day, no matter what you do?

   Yes  No

9. Do you feel that most of the time parents listen to what their children have to say?

   Yes  No

10. Do you believe that wishing can make good things happen?

    Yes  No

11. When you get rejected, does it usually seem it’s for no good reason at all?

    Yes  No

12. Most of the time do you find it hard to change a friend’s opinion?

    Yes  No

13. Do you think that cheering, more than luck, helps a team to win?

    Yes  No

14. Did you feel that it was nearly impossible to change your parents’ minds about anything?

    Yes  No

15. Do you believe that parents should allow children to make most of their own decisions?

    Yes  No

16. Do you feel that when you do something wrong there’s very little you can do to make it right?

    Yes  No

17. Do you believe that most people are just born good at sports?

    Yes  No
18. Are most of the other people your age and sex stronger than you are?
   
   Yes  No

19. Do you feel that one of the best ways to handle most problems is just not to think about them?
   
   Yes  No

20. Do you feel that you have a lot of choice in deciding who your friends are?
   
   Yes  No

21. If you find a four leaf clover, do you believe that it might bring good luck?
   
   Yes  No

22. Did you often feel that whether or not you did your homework had much to do with what kind of grades you got?
   
   Yes  No

23. Do you feel that when a person your age decides to be angry with you, there’s little you can do to stop him or her?
   
   Yes  No

24. Have you ever had a good luck charm?
   
   Yes  No

25. Do you believe that whether or not people like you depends on how you act?
   
   Yes  No

26. Did your parents usually help you if you asked them to?
   
   Yes  No

27. Have you ever felt that when people were angry with you, it was usually for no reason at all?
   
   Yes  No
28. Most of the time, do you feel that you can change what might happen tomorrow by what you do today?

   Yes   No

29. Do you believe that when bad things are going to happen they just are going to happen no matter what you do to try to stop them?

   Yes   No

30. Do you think that people can get their own way if they just keep trying?

   Yes   No

31. Most of the time, did you find it useless to try to get your own way at home?

   Yes   No

32. Do you feel that when good things happen, they happen because of hard work?

   Yes   No

33. Do you feel that when somebody your age wants to be your enemy, there’s little you can do to change matters?

   Yes   No

34. Do you feel that it’s easy to get friends to do what you want them to do?

   Yes   No

35. Did you usually feel that you had little to say about what you got to eat at home?

   Yes   No

36. Do you feel that when someone doesn’t like you there’s little you can do about it?

   Yes   No

37. Did you usually feel that it was almost useless to try in school because most other students were just plain smarter than you were?

   Yes   No
38. Are you the kind of person that believes that planning ahead makes things turn out better?

Yes No

39. Most of the time, did you feel that you had little to say about what your family decided to do?

Yes No

40. Do you think it’s better to be smart than to be lucky?

Yes No
APPENDIX C

LIFE ORIENTATION TEST

Scheier, Carver, & Bridges (1994)

Instructions:

Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no “correct” or “incorrect” answers. Answer according to your own feelings, rather than how you think “most people” would answer.

1. In uncertain times, I usually expect the best.
   1 Strongly Disagree 2 Neutral 3 Agree 4 5 Strongly Agree

2. It’s easy for me to relax. (filler item)
   1 Strongly Disagree 2 Neutral 3 Agree 4 5 Strongly Agree

3. If something can go wrong for me, it will.
   1 Strongly Disagree 2 Neutral 3 Agree 4 5 Strongly Agree

4. I’m always optimistic about my future.
   1 Strongly Disagree 2 Neutral 3 Agree 4 5 Strongly Agree
5. I enjoy my friends a lot. (filler item)

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6. It’s important for me to keep busy. (filler item)

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7. I hardly ever expect things to go my way.

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8. I don’t get upset too easily. (filler item)

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9. I rarely count on good things happening to me.

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10. Overall, I expect more good things to happen to me than bad.

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APPENDIX D

LEARNING GOAL ORIENTATION

Adapted from VandeWalle 1997; Elliot & Church, 1997

Instructions: Next you will see statements dealing with your feelings about learning and goal setting. Please choose the extent to which you agree or disagree with these statements.

1. I am willing to select a challenging assignment that I can learn a lot from.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree

2. I often look for opportunities to develop new skills and knowledge.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree

3. I enjoy challenging and difficult tasks where I’ll learn new skills.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree

4. For me, development of my ability is important enough to take risks.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree

5. I prefer situations that require a high level of ability and talent.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree
6. In general, I want to learn as much as possible.

   1
   Strongly Disagree

   2
   Disagree

   3
   Neutral

   4
   Agree

   5
   Strongly Agree

7. I prefer learning new tasks that arouse my curiosity, even if they are difficult to learn.

   1
   Strongly Disagree

   2
   Disagree

   3
   Neutral

   4
   Agree

   5
   Strongly Agree

8. In general, I desire to completely master new skills.

   1
   Strongly Disagree

   2
   Disagree

   3
   Neutral

   4
   Agree

   5
   Strongly Agree

9. I would rather demonstrate my ability on a task that I can do well at than to try a new task.

   1
   Strongly Disagree

   2
   Disagree

   3
   Neutral

   4
   Agree

   5
   Strongly Agree

10. I’m concerned with showing that I can perform better than others.

    1
    Strongly Disagree

    2
    Disagree

    3
    Neutral

    4
    Agree

    5
    Strongly Agree

11. I try to figure out what it takes to prove my ability to others.

    1
    Strongly Disagree

    2
    Disagree

    3
    Neutral

    4
    Agree

    5
    Strongly Agree

12. I enjoy it when others are aware of how well I am doing.

    1
    Strongly Disagree

    2
    Disagree

    3
    Neutral

    4
    Agree

    5
    Strongly Agree
13. I prefer to work on projects where I can demonstrate my ability to others.

1: Strongly Disagree 2: Disagree 3: Neutral 4: Agree 5: Strongly Agree

14. I am motivated by the thought of outperforming others.

1: Strongly Disagree 2: Disagree 3: Neutral 4: Agree 5: Strongly Agree

15. I would avoid taking on a new task if there was a chance that I would appear incompetent to others.

1: Strongly Disagree 2: Disagree 3: Neutral 4: Agree 5: Strongly Agree

16. Avoiding a show of low ability is more important to me than learning a new skill.

1: Strongly Disagree 2: Disagree 3: Neutral 4: Agree 5: Strongly Agree

17. I’m concerned about taking on a task if my performance would reveal that I had low ability.

1: Strongly Disagree 2: Disagree 3: Neutral 4: Agree 5: Strongly Agree

18. I prefer to avoid situations where I might perform poorly.

1: Strongly Disagree 2: Disagree 3: Neutral 4: Agree 5: Strongly Agree

19. In general, I worry about the possibility of performing poorly.

1: Strongly Disagree 2: Disagree 3: Neutral 4: Agree 5: Strongly Agree
20. In general, I just want to avoid doing poorly.

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21. I’m afraid that if I ask a “dumb” question, others might not think I’m very smart.

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APPENDIX E

TRAINING SELF-EFFICACY SCALE

Adapted from Schwarzer & Jerusalem (1995), and Chiaburu & Marinova (2005)

**Instructions:** Next you will see some statements about being trained to do a job. Please indicate the degree to which you agree with the statement.

1. In training for a job, I could learn how to do the job as well as anyone else.

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2. In training for a job, I expect that I would do well.

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3. In training for a job, I could remember information taught to me.

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4. In training for a job, I am confident I could learn to do the job even if I had never done it before.

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5. In training for a job, I will likely perform poorly.

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6. In training for a job, I would be nervous about my ability to learn new skills.

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7. In training for a job, I would perform better than most others in the training.

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8. In training for a job, I could learn a new skill if I tried hard enough.

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9. In training for a job, it would be hard for me to learn something new.

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APPENDIX F

MOTIVATION TO LEARN

Adapted from Weisbein (2000); Noe & Wilk, (1993)

Instructions: The following statements refer to the **SECOND** ambulance training session (Backing and Maneuvering) only. Please indicate the degree to which you agree with the following statements.

1. I got more from the **second** ambulance training session than most people.
   
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2. I am confident I did well in the **second** training session.

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3. I was confident I could improve my skills by participating in the **second** training session.

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4. I was confident I could learn the material presented in the **second** training session.

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5. I was motivated to learn the skills emphasized in the second session of the ambulance training program.

1 2 3 4 5
Strongly Disagree Disagree Neutral Agree Strongly Agree

6. I tried to learn as much as I could from the second ambulance training session.

1 2 3 4 5
Strongly Disagree Disagree Neutral Agree Strongly Agree

7. I was interested in learning the training material in the second training session.

1 2 3 4 5
Strongly Disagree Disagree Neutral Agree Strongly Agree

8. I wanted to improve my skills as an ambulance driver in the second training session.

1 2 3 4 5
Strongly Disagree Disagree Neutral Agree Strongly Agree

9. During the second training session, I became so frustrated I stopped trying to learn.

1 2 3 4 5
Strongly Disagree Disagree Neutral Agree Strongly Agree

10. I had little interest in learning the material in the second ambulance training session.

1 2 3 4 5
Strongly Disagree Disagree Neutral Agree Strongly Agree

11. I believed I could learn material presented in the second ambulance training session.

1 2 3 4 5
Strongly Disagree Disagree Neutral Agree Strongly Agree
APPENDIX G

TASK-SPECIFIC SELF-EFFICACY SCALE 1

Adapted from Schwarzer & Jerusalem (1995), and Chiaburu & Marinova (2005)

Instructions: Next you will see some statements about being trained to be an ambulance driver. Please indicate the degree to which you agree with the statements.

1. In training to be an ambulance driver, I could learn how to properly maneuver an ambulance.

   1  2  3  4  5
   Strongly Disagree Neutral Agree Strongly Agree

2. In training to be an ambulance driver, I could learn how to properly use roadside flares.

   1  2  3  4  5
   Strongly Disagree Neutral Agree Strongly Agree

3. In training to be an ambulance driver, I could learn how to back/reverse the ambulance.

   1  2  3  4  5
   Strongly Disagree Neutral Agree Strongly Agree

4. In training to be an ambulance driver, I could learn how to avoid getting into accidents.

   1  2  3  4  5
   Strongly Disagree Neutral Agree Strongly Agree
5. In training to be an ambulance driver, I could learn how to properly use the vehicle’s mirrors.

1  2  3  4  5  
Disagree  Neutral  Agree  Strongly Agree

6. In training to be an ambulance driver, I could learn how to park the ambulance at an emergency scene.

1  2  3  4  5  
Disagree  Neutral  Agree  Strongly Agree

7. In training to be an ambulance driver, I could learn the steps for the pre-trip inspection.

1  2  3  4  5  
Disagree  Neutral  Agree  Strongly Agree

8. In training to be an ambulance driver, I could learn how to operate the sirens and lights.

1  2  3  4  5  
Disagree  Neutral  Agree  Strongly Agree

9. In training to be an ambulance driver, I could learn safety rules and regulations.

1  2  3  4  5  
Disagree  Neutral  Agree  Strongly Agree

10. In training to be an ambulance driver, I could learn how to properly operate the vehicle’s turn signals.

1  2  3  4  5  
Disagree  Neutral  Agree  Strongly Agree
11. In training to be an ambulance driver, I could learn how to properly operate the vehicle’s headlights.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree

12. In training to be an ambulance driver, I could learn how to give hand signals to help my partner back/reverse the ambulance.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree
APPENDIX H

TASK-SPECIFIC SELF-EFFICACY SCALE 2

Adapted from Arthur, Bell, & Edwards, 2007

Time 1

Instructions: Please read each of the following statements and indicate how much you personally agree with each statement by marking the response that most applies to you.

1. I feel confident in my ability to perform well in the ambulance driver training.

   1  2  3  4  5
   Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

2. I can meet the challenges of the ambulance driver training.

   1  2  3  4  5
   Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

3. I know I can achieve good scores in the ambulance driver training.

   1  2  3  4  5
   Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

4. I know that I can master the ambulance driver training.

   1  2  3  4  5
   Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

5. I do not think ambulance driver training is something that I will become good at.

   1  2  3  4  5
   Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree
6. I am confident that I have what it takes to perform well in ambulance driver training.

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Task-Specific Efficacy Scale Time 2

**Instructions:** The following questions refer to how you felt BEFORE the SECOND training module began. Please read each of the statements and indicate how much you personally agree with each statement by marking the response that most applies to you.

1. I felt confident in my ability to perform well in the second ambulance driver training module.

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2. I felt I could meet the challenges of the second ambulance driver training.

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3. I knew I could achieve good scores in the second ambulance driver training.

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4. I knew that I could master the second ambulance driver training.

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5. I did not think the second ambulance driver training was something that I would be good at.

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6. I was confident that I had what it took to perform well in the second ambulance driver training.

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APPENDIX I

TASK EFFORT

Instructions: Below is a list of statements dealing with the effort you exerted in completing the SECOND ambulance training session. Please indicate the extent to which you agree or disagree with these statements.

1. I put a good deal of effort into learning the material from the second training session.
   - 1: Strongly Disagree
   - 2: Disagree
   - 3: Neutral
   - 4: Agree
   - 5: Strongly Agree

2. I concentrated on learning the material in the second training module most of the time.
   - 1: Strongly Disagree
   - 2: Disagree
   - 3: Neutral
   - 4: Agree
   - 5: Strongly Agree

3. I invested a lot of energy in order to learn the material in the second training session.
   - 1: Strongly Disagree
   - 2: Disagree
   - 3: Neutral
   - 4: Agree
   - 5: Strongly Agree

4. I hardly paid attention to the material in the second training program at all.
   - 1: Strongly Disagree
   - 2: Disagree
   - 3: Neutral
   - 4: Agree
   - 5: Strongly Agree

5. I did not really spend a lot of energy attempting to learn the material in the second training program.
   - 1: Strongly Disagree
   - 2: Disagree
   - 3: Neutral
   - 4: Agree
   - 5: Strongly Agree
APPENDIX J

TRAINING PERFORMANCE QUESTIONS TEST 1 (PASS CONDITION)

1. As the ambulance driver, you are responsible for the safety of
   a. yourself.
   b. your partner.
   c. the patient.
   d. all of the above.

2. What is the maximum safe speed for narrow streets?
   a. 5 miles per hour
   b. 10 miles per hour
   c. **15 miles per hour**
   d. 20 miles per hour

3. In order to stop within the area lit by your headlights, you must be driving below
   a. 40 miles per hour.
   b. **50 miles per hour.**
   c. 55 miles per hour.
   d. 65 miles per hour.

4. One of the reasons people have accidents is because they
   a. underestimate the performance capabilities of the ambulance.
   b. **overestimate the performance capabilities of the ambulance.**
   c. underestimate your own performance capabilities.
   d. all of the above.
5. You come to an unregulated crossing. A driver stops after you on your left. Another driver has stopped ahead of you to the right. How do you proceed?
   
a. You have the right of way; move on.
b. The drive on the right should proceed, then you.
c. Watch, and if another vehicle assumes the right-of-way, let them go.
d. Assume that your emergency vehicle has right-of-way; proceed with caution.

6. Turning points of your vehicle are imaginary points on your bumper that align with

   a. the center of the road you’re turning into.
b. the left divider line of the road you’re turning into.
c. the vehicle in front of you.
d. the next intersection.

7. When a large object suddenly appears in front of the ambulance while driving, the best strategy is to

   a. swerve to avoid hitting the object.
b. engage in emergency stopping procedures.
c. try to hit the object head on.
d. slow down and steer to the right.

8. While driving the ambulance, if a hazard ahead requires that you slow down, you should let drivers behind you know about it by

   a. turning on your emergency siren.
b. turning on your emergency lights.
c. applying steady pressure to your brakes.
d. lightly tapping your brakes a few times.

9. When two vehicles arrive at an unregulated intersection

   a. the vehicle on the right has the right of way.
b. the vehicle on the left has the right of way.
c. the drivers must signal who will proceed first.
d. drivers proceeding straight go first.
10. When placing flares at an emergency scene, how many feet behind the ambulance should the second flare be placed?

   a. 50 feet
   b. 100 feet
   c. 200 feet
   d. 300 feet

11. Which of these statements about turn signals is false?

   a. **Apply turn signal lights as you start to turn the corner.**
   b. Turn off the signal only after you have completed the turn.
   c. Apply turn signal lights well before turning.
   d. Apply turn signal lights before changing lanes.

12. Do not stop on railroad tracks

   a. if the gates are down.
   b. if you can hear the train approaching.
   c. if you cannot see very far down the tracks.
   d. **in any situation.**

13. The proper order to check for oncoming traffic or trains is to look

   a. right, left, right.
   b. right, ahead, left.
   c. **left, right, left.**
   d. left, ahead, right.

14. You should only light a flare inside a vehicle if

   a. it is raining or other conditions would put it out.
   b. there is brush or vegetation that might catch fire.
   c. there are combustible chemicals or vapors present.
   d. **you should never light a flare in the vehicle.**

15. If the ambulance begins to skid while attempting to stop you should

   a. apply firm pressure to the brakes.
   b. turn the ambulance into the skid.
   c. stare down the hood of the ambulance.
   d. **keep the ambulance wheels rolling.**
16. In narrow streets, the ambulance should have at least ________ inches of clearance on either side.

   a. 12 inches
   b. 18 inches
   c. 24 inches
   d. 48 inches

17. When should you turn on your headlights in order to be more easily seen?

   a. Between sunset and sunup
   b. By using your headlight auto setting
   c. **If you are having trouble seeing other vehicles**
   d. When dispatch orders all drivers to turn on their headlights

18. Which road surface is most likely to glaze over quickly in freezing conditions?

   a. asphalt
   b. **concrete**
   c. dirt/gravel
   d. both a and b

19. Before leaving the scene of an emergency, you must ensure that

   a. you have contacted the police department.
   b. you have received clearance from police on the scene.
   c. you have secured all payment for transportation costs.
   d. **you have secured all objects in the ambulance.**

20. You will not have to slow as much around curves if

   a. the surface of the curve is level.
   b. the surface of the curve is dry.
   c. the inside of the curve is higher than the outside.
   d. **the outside of the curve is higher than the inside.**
APPENDIX K

TRAINING PERFORMANCE QUESTIONS TEST 1 (FAIL CONDITION)

1. What is the maximum safe speed for narrow streets?
   a. 5 miles per hour
   b. 10 miles per hour
   **c. 15 miles per hour**
   d. 20 miles per hour

2. In order to stop within the area lit by your headlights, you must be driving below
   a. 40 miles per hour.
   **b. 50 miles per hour.**
   c. 55 miles per hour.
   d. 65 miles per hour.

3. One of the reasons people have accidents is because they
   a. underestimate the performance capabilities of the ambulance.
   **b. overestimate the performance capabilities of the ambulance.**
   c. underestimate your own performance capabilities.
   d. all of the above.

4. You come to an unregulated crossing. A driver stops after you on your left. Another driver has stopped ahead of you to the right. How do you proceed?
   a. You have the right of way; move on.
   b. The drive on the right should proceed, then you.
   **c. Watch, and if another vehicle assumes the right-of-way, let them go.**
   d. Assume that your emergency vehicle has right-of-way; proceed with caution.
5. When at an emergency scene on a two lane road, how many flares should be placed on the ground in order to warn other drivers?
   a. 2   
   b. 3   
   c. 4   
   d. 5

6. Turning points of your vehicle are imaginary points on your bumper that align with
   a. the center of the road you’re turning into.  
   b. the left divider line of the road you’re turning into.  
   c. the vehicle in front of you.  
   d. the next intersection.

7. When a large object suddenly appears in front of the ambulance while driving, the best strategy is to
   a. swerve to avoid hitting the object.  
   b. engage in emergency stopping procedures.  
   c. try to hit the object head on.  
   d. slow down and steer to the right.

8. When confronted with a pothole, the best course of action is
   a. to drive around it.  
   b. hit the pothole squarely.  
   c. hit as little of the pothole as possible.  
   d. brake as you hit the pothole.

9. When two vehicles arrive at an unregulated intersection
   a. the vehicle on the right has the right of way.  
   b. the vehicle on the left has the right of way.  
   c. the drivers must signal who will proceed first.  
   d. drivers proceeding straight go first.

10. When placing flares at an emergency scene, how many feet behind the ambulance should the second flare be placed?
    a. 50 feet   
    b. **100 feet**   
    c. 200 feet   
    d. 300 feet
11. When pulling the ambulance over to the side of the road to stop, you should make sure to place triangles or flares

   a. at the top of a hill.
   b. 500 feet in front of the ambulance.
   c. at intervals of 10, 50, and 100 feet behind the ambulance.
   d. **within five minutes of stopping the ambulance.**

12. Which of the following are not held or worn to alert others to potential danger?

   a. vests
   b. chemical light sticks
   c. **flares**
   d. flashlights

13. When making a left hand turn, you should

   a. put on your turn signal at least 75 feet before the turn.
   b. keep your ambulance near the left side of the lane you are turning from.
   c. line up your left-hand turning point with the center of the road you are turning towards.
   d. **check your mirrors as you approach the intersection and again as you make the turn.**

14. Rule 5 of the 7 rules for avoiding right-hand-turn accidents states that you should

   a. **make your turn at a safe and even speed.**
   b. adjust your mirrors so you can see as much as possible.
   c. be sure that the intersection is clear of moving or parked vehicles.
   d. if you ever have any doubts about a turn, don’t turn.

15. If the ambulance begins to skid while attempting to stop you should

   a. apply firm pressure to the brakes.
   b. turn the ambulance into the skid.
   c. stare down the hood of the ambulance.
   d. **keep the ambulance wheels rolling.**
16. In narrow streets, the ambulance should have at least ________ inches of clearance on either side.

   a. 12 inches  
   b. 18 inches  
   c. 24 inches  
   d. 48 inches

17. When should you turn on your headlights in order to be more easily seen?

   a. Between sunset and sunup  
   b. By using your headlight auto setting  
   c. If you are having trouble seeing other vehicles.  
   d. When dispatch orders all drivers to turn on their headlights.

18. Which road surface is most likely to glaze over quickly in freezing conditions?

   a. asphalt  
   b. concrete  
   c. dirt/gravel  
   d. both a and b

19. When an emergency scene is limited to one side of the roadway, how many flares should be placed alongside the scene?

   a. 0  
   b. 1  
   c. 2  
   d. 3

20. You will not have to slow as much around curves if

   a. the surface of the curve is level.  
   b. the surface of the curve is dry.  
   c. the inside of the curve is higher than the outside.  
   d. the outside of the curve is higher than the inside.
APPENDIX L

TRAINING PERFORMANCE QUESTIONS TEST 2

1. To ensure you will be able to back safely, be sure your pre-trip inspection includes

   a. your backing lights, alarm, and warning flashers.
   b. a visual acuity examination.
   c. your tire pressure and brakes.
   d. all of the above.

2. Rule 2 of the 6 basic rules to avoid backing accidents states that you should

   a. pay attention to your surroundings.
   b. establish drive-through parking on scene whenever possible.
   c. never back the ambulance unless it's absolutely necessary.
   d. always back slowly, about the average walking speed.

3. Which of the following statements is true about maneuvering in tight quarters?

   a. It’s OK to scrape if you don’t dent.
   b. Use your reference points and a spotter whenever possible.
   c. Use reference points only when traveling in reverse.
   d. It’s as easy to get out as it is to get in.

4. What is NOT a common area for ambulance accidents to happen?

   a. Hospitals and other care facilities
   b. Emergency scenes
   c. Major highways
   d. Side streets and alleyways

5. When parking the ambulance at an emergency scene you should

   a. pull into a wide open space away from other vehicles.
   b. stage the ambulance so that you have a clear exit.
   c. find a civilian to be a spotter.
   d. find a police officer to tell you where to park.
6. All of the following are goals in parking the ambulance at an emergency scene EXCEPT

   a. getting as close to the scene as possible.
   b. not impeding the flow of traffic at the scene.
   c. keeping the ambulance from being hit.
   d. complying with city parking ordinances.

7. Which is the biggest drawback of using a convex mirror?

   a. The narrow view distorts your sense of perception.
   b. Objects are farther away than they appear.
   c. Objects are closer than they appear.
   d. They reduce your line of sight.

8. The safest backing technique is

   a. using a spotter to guide you.
   b. using a spotter and reference points.
   c. to avoid backing at all costs.
   d. backing in a wide open area.

9. Regarding blind spots, you can expect other drivers to

   a. be aware of and watch out for your blind spots.
   b. be conscious of their own vehicle’s blind spots.
   c. flash their lights when they drift into your blind spots.
   d. ignore their blind spots as well as your own.

10. Ambulance accidents are typically caused by people who

    a. are impaired by alcohol or drug use.
    b. aren’t driving with a valid license.
    c. aren’t prepared to react to them.
    d. are paying attention to patients.

11. When you are using a spotter, you should back the ambulance no faster than

    a. 5 mph.
    b. 10 mph.
    c. normal jogging speed.
    d. normal walking speed.
12. According to behavior theory, accidents happen because

   a. **most of the mistakes we make don’t result in punishment.**
   b. most of the mistakes we make do result in punishment.
   c. most of the mistakes we make are not rewarded.
   d. most of the mistakes we make are rewarded.

13. Step one of finding your reference points for your vehicle has you set up orange plastic cones _____ feet behind your ambulance.

   a. 5
   b. 6
   c. 7
   d. 8

14. When should you find the reference points for the ambulance you are driving?

   a. On the first call
   b. During the pre-trip inspection
   c. **Before it is assigned to you**
   d. When you first need to use them

15. When can you disable a backing alarm?

   a. When police instruct you to disable it
   b. After you have been driving for ten years
   c. When you use a spotter
   d. **It should never be disabled**

16. When figuring out your reference points, you should back the ambulance until your rear bumper is _____ inches in front of the orange cone.

   a. 6
   b. **12**
   c. 18
   d. 24

17. You minimize your ambulance’s blind spots by

   a. driving above the speed limit.
   b. **moving your line of vision.**
   c. cleaning and adjusting your mirrors properly.
   d. adjusting your rear view mirror.
18. Which of these statements about backing a heavy vehicle is the truest?

a. **Avoid backing whenever you can.**
   
b. When you use a spotter, he or she should use clear voice signals.

c. It is safer to back toward the left side of the vehicle than to the right.

d. Back only in familiar areas.

19. Which of these statements about mirrors is accurate?

a. You should look at each of your mirrors for several seconds at a time.

b. Convex mirrors make things look wider than they really are.

c. **There are blind spots that your mirror cannot show you.**

d. Changing lanes negates the mirrors opposite the new lane.

20. The spotter you use to maneuver in tight corners should primarily be

a. a police officer.

b. a fire fighter.

c. a responsible adult.

d. **your partner.**

21. Which of your mirrors gives you a wider view from the ambulance?

a. **Convex**

b. Concave

c. Flat

d. Rear view

22. How should you communicate with your spotter?

a. Roll down your window so that you can see and hear the spotter

b. Use your PA system

c. Use hand signals

d. **Both A and C**

23. When you arrive at an emergency scene, the first thing you should do is

a. **assess the situation.**

b. report to the scene commander.

c. contact dispatch.

d. discuss hand signals with your partner.
24. When backing, the most important hand signal to agree upon between the driver and the spotter is the one for
   a. turning to the right.
   b. continue backing.
   c. stopping.
   d. low clearance.

25. You best view of your own ambulance is in which mirror?
   a. The flat mirror
   b. The rear view mirror
   c. The convex mirror
   d. The passenger’s side mirror

26. When maneuvering in tight corners, principle four says that
   a. if you don’t have to maneuver in tight quarters, don’t.
   b. whenever possible, establish drive-through parking.
   c. always use a spotter if you have to maneuver in tight quarters.
   d. always make your most difficult maneuvers when you arrive at a location.

27. When backing up, your best source of information comes from
   a. your rear view mirrors.
   b. your spotter.
   c. your sense of space.
   d. your backing alarm.

28. Never back into traffic with the ambulance without
   a. turning on your sirens.
   b. using a spotter.
   c. contacting your dispatcher.
   d. police clearance.

29. Your flat mirror should be adjusted so that you can see approximately ______ feet beyond the back of the ambulance.
   a. 100
   b. 150
   c. 200
   d. 250
30. How can you use the mirror to cover more area?

- **a. Leaning backward and forward**
- b. Re-adjusting it as you drive
- c. Turning your vehicle when you can
- d. Using your space cushions

31. About _________ of ambulance collisions involve backing.

- a. one quarter
- b. one third
- c. one half
- d. three quarters

32. When beginning to back the ambulance, the first thing you should tell your spotter is

- a. where to stand.
- b. **where you want to back to.**
- c. how to switch sides.
- d. how you’ll be loading the patient.

33. To properly clean your mirrors, you should use

- a. rubbing alcohol.
- b. cotton bandages.
- c. **ammonia-based cleaner.**
- d. peroxide-based cleaner.

34. Your ______ is a boundary that surrounds your ambulance.

- a. safety void
- b. safety zone
- c. area of safety
- d. **cushion of safety**

35. Your reference points

- a. **always remain the same.**
- b. change depending upon the size of the space in which you are in.
- c. are determined by your spotter.
- d. are not always helpful in tight quarters.
36. When backing the ambulance, if you lose sight of your spotter you should

   a. **bring the ambulance to a complete stop.**
   b. roll down your window and call out to your spotter.
   c. turn the vehicle as you back to locate your spotter.
   d. proceed at a walking speed.

37. Typically, accidents involving an ambulance are

   a. moving objects accidents.
   b. **fixed objects accidents.**
   c. nighttime driving accidents.
   d. personal injury accidents.

38. Accidents usually result in damage that

   a. involves personal injury.
   b. results in a lawsuit against AMR.
   c. results in a traffic ticket for the driver.
   d. **takes the ambulance out of service.**
APPENDIX M

COMPUTER ANXIETY

O’Connell, Doverspike, Gilliken, & Meloun, (2001)

Instructions: Please read each of the following statements carefully and select the response that best represents your attitude, belief, or opinion regarding each statement. There are no right or wrong answers.

1. I usually get very anxious about using a computer.

   1 Strongly Disagree  2 Disagree  3 Neutral  4 Agree  5 Strongly Agree

2. Computers do not scare me at all.

   1 Strongly Disagree  2 Disagree  3 Neutral  4 Agree  5 Strongly Agree

3. I get a sinking feeling when trying to use a computer.

   1 Strongly Disagree  2 Disagree  3 Neutral  4 Agree  5 Strongly Agree

4. Computers intimidate and threaten me.

   1 Strongly Disagree  2 Disagree  3 Neutral  4 Agree  5 Strongly Agree

5. I hesitate to use a computer for fear of making mistakes I cannot correct.

   1 Strongly Disagree  2 Disagree  3 Neutral  4 Agree  5 Strongly Agree
6. I think that a computer can be very interesting.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree

7. Working with computers is not my idea of fun.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree

8. I’m not the type to do well with computers.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree

9. I have a lot of self-confidence when it comes to working with computers.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree

10. I like working with computers.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree

11. I feel like a technological outcast because I don’t use computers very much, if at all.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree

12. Whenever I use something that is computerized, I am afraid I will break it.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree
APPENDIX N

THE WONDERLIC PERSONNEL TEST

Items copyrighted to Wonderlic, therefore they are not available for reprint here.
APPENDIX O

FEEDBACK ACCURACY

Adopted from Keeping & Levy, 2000

Instructions: Next you will see statements about the feedback you received after the FIRST ambulance training session. Please choose the extent to which you agree or disagree with these statements.

1. The feedback was an accurate evaluation of my performance.

   1  2  3  4  5
   Strongly Disagree Neutral Agree Strongly Agree

2. I do not feel the feedback reflected my actual performance.

   1  2  3  4  5
   Strongly Disagree Neutral Agree Strongly Agree

3. The feedback was consistent with how I felt I performed.

   1  2  3  4  5
   Strongly Disagree Neutral Agree Strongly Agree

4. The feedback was not a true assessment of my work.

   1  2  3  4  5
   Strongly Disagree Neutral Agree Strongly Agree
APPENDIX P
MANIPULATION CHECK

Instructions: Next you will see statements about the feedback you received after the FIRST ambulance training session. Please choose the extent to which you agree or disagree with these statements.

1. The feedback about my performance on the first training session was positive.
   
   1 2 3 4 5
   Strongly Disagree Disagree Neutral Agree Strongly Agree

2. The feedback said that I passed the first training session.
   
   1 2 3 4 5
   Strongly Disagree Disagree Neutral Agree Strongly Agree

3. The feedback about my performance on the first training session was negative.
   
   1 2 3 4 5
   Strongly Disagree Disagree Neutral Agree Strongly Agree

4. The feedback said that I failed the first training session.
   
   1 2 3 4 5
   Strongly Disagree Disagree Neutral Agree Strongly Agree
APPENDIX Q

DEMOGRAPHIC INFORMATION

Please fill in or click on the appropriate response for the following items.

Please type your Age in years. __________

Gender:       Male    Female

Year in School:  Freshman  Sophomore  Junior  Senior  Other__________

Student Status:    Full Time    Part Time

Ethnicity:        African American
                 Asian
                 Caucasian
                 Hispanic
                 Multiracial
                 Native American
                 Other ____________
APPENDIX R

COMPUTER INSTRUCTIONS AND FEEDBACK SCRIPTS

Welcome Screen

Hello! Today you will be participating in a study examining a multistage computer-based training environment. Many companies are now using computerized training to teach new workers important skills. Often, this material is presented in a multistage format where the learner completes a module, is tested on the material, and then proceeds to the next module. Today, you will be asked to do a number of things including 1) completing surveys, 2) learning material in two training modules, and 3) taking short tests about the material you learned. Also, it is important to read all of the directions carefully so please pay close attention to the instructions throughout the process. If you have any questions, please raise your hand and the study administrator will help you.

Press the CONTINUE button at the bottom of this screen to begin.

Wonderlic Instructions

Before you start your training, there are a couple of tasks I would like you to complete. The first task is a 12 minute pre-training task that we are developing for future use. Following this, you will be asked to respond to a number of questions about yourself. Please click continue below to begin the first task.
**Survey Instructions**

Now I would like you to respond to a number of questions about yourself. Please answer these questions honestly, as there are no right or wrong answers. The questions should take approximately 15 minutes to complete before you begin training.

**Transition Screen 1**

You have now completed all of the pre-training questionnaires. Before you begin the training, you will be presented with information about how to navigate the training environment. Please read this information carefully. If you have any questions about using the training program, please raise your hand for the study administrator. Also, please put on the headphones at this time if you have not already done so.

**Training Module Instructions**

You are a trainee for American Medical Response (AMR). You will need to learn some important information before you will be able to start your new job as an Ambulance Driver and, therefore, need to complete this computer training course. Your new company (AMR) wants you to try and learn all of the information in the computer training modules. You will be given as much time as needed to complete the training modules. Typically, it has taken 50-60 minutes for trainees to complete both training modules. After completion of each module you will be tested over the information that was presented.

Please click on the CONTINUE button when you have finished reading the instructions.
Training Technical Instructions

Screen One

While going through the training material, there will be a number of buttons that you can use at certain times during the training. A REPLAY, CONTINUE, PREVIOUS SCREEN, and PREVIOUS MENU button will appear on most screens. The REPLAY button will start the recording and/or video from the beginning and play back through to completion. The CONTINUE button will allow you to advance from the current recording/video to the next section of the training. The PREVIOUS SCREEN button will bring you back to the last screen you viewed. The PREVIOUS MENU button will bring you back to the most recent menu screen. NOTE: if you click on a button and it is not working, it may because you have not completed a certain step that needs to be done before continuing through the training. For example, the “Test” button will not be available when you first begin training. You will be able to use this button once you have completed the training program. Try pressing the CONTINUE button now to move to the next screen.

Screen Two

While going through the training there are a couple of technical issues that you should be aware of. During different sections of the training, you will be presented with menu options to choose from. Once you have selected an option and completed the material in that section, you will be returned to the most recent menu screen. At this point you have the option of repeating the material that you have previously seen if you would like further practice. However, the option that you had originally selected will now be shaded as a reminder that you have already completed that section.
Press the CONTINUE button to begin the training module.

**Break Screen 1**

Before taking your first exam, you may take a 5-minute break to relax, use the restroom, or stretch your legs. This is the only break opportunity you will have during the training. If you would like to take a break, please select the TAKE BREAK option below. If, however, you would like to continue working, select the CONTINUE TRAINING option below.

**Break Screen 2**

Show a picture of a clock counting down from 5 mins. At the bottom of the screen include a button that allows them to end their break early and begin taking the test.

**Transition Screen 2**

You have now completed test one. Please wait as the computer tabulates your score. In a moment, you will receive feedback about your performance on the test to give you an idea of how well you are learning the material. After receiving the feedback, you will then be able to begin the second training session.

**Poor Performance Feedback**

AMR expects its trainees to receive high scores on the training module exam given the importance of the role of an ambulance driver. Your performance, however, on the first test was poor as you received a score below the 80% cutoff, thus failing to correctly answer many of the test items. As an ambulance driver, it is critical that you learn proper ambulance safety and operations. Injured patients put their lives in your hands, and, as such, you must have a thorough knowledge base to do your job since it could mean the difference between life and death for your patient. Given your inadequate
performance on the first training module, you will need to try harder in the second module in order to pass the training.

Please click on the CONTINUE button below to begin the second training module.

**Good Performance Feedback**

Congratulations! Your performance on the training module exam was superior. Your score was above the 80% cutoff point and shows that you have a strong grasp of the material. This is excellent given the importance of the role of an ambulance driver. Injured patients put their lives in your hands, and, as such, you must have a thorough knowledge base to do your job since it could mean the difference between life and death for your patient. Clearly, from your performance on the first test you are well on your way to being a successful ambulance driver. Please click on the CONTINUE button below to begin the second training module.

**Pre Training Module 2 Script**

You have now answered all of the pre-training questions. Click continue below to begin the second training module. At this time, please put on the headphones if you do not already have them on.

**Test 2 Pre-Screen**

Before taking the second training module exam, I would like to ask you a few questions about how motivated you were to learn the material presented during the second training session. At this point, I would like you to step out of your role as an ambulance trainee. Please answer these questions honestly, as part of the purpose of this study is to assess the value of the training module itself so that we can make adjustments to the training if needed.
**Transition Screen 3**

You have now completed all of the pre-test questions. By clicking on the CONTINUE button below, you will begin TEST 2. This test asks questions about the training material in the second training session only. Please answer these questions carefully.

**Test 2 Post-Screen**

Before you go, I would like to ask you a few more questions. These questions will take approximately 5 minutes to complete. At the end of the questions you will also be asked to provide information to ensure you receive your extra credit for participating. Please be sure to fill this portion out completely.

**Thank You and Debriefing Screen**

Thank you for participating in this study. The purpose of this study was to examine how trainees respond to receiving negative performance feedback during training. The feedback you received at the end of the first training session regarding your test performance was false and did not reflect your actual performance on the training. This was done so that I could give an even number of people positive and negative feedback about their performance so that I can determine how trainees respond to both positive and negative feedback. I apologize for any discomfort these deceptions may have caused, but I feel it was necessary in order to understand the process involved in receiving feedback during training. I hope that by examining how trainees respond to feedback, I can better understand how to design and implement training in a manner that keeps trainees motivated through multiple stages of training.
You have now completed the study. Please inform the study administrator that you have finished. Thanks again for your participation, and if you have any questions about the results please don’t hesitate to contact the researcher, Ryan Robinson, at robinsry22@yahoo.com.
APPENDIX S

HUMAN SUBJECTS APPROVAL

Office of Research Services and Sponsored Programs
Akron, OH 44326-2102
0330 972-7968 Office
0330 972-6281 Fax

November 13, 2006

Ryan Robinson
165 Hunt Club Dr., Apt. 2C
Capley, Ohio 44321

Mr. Robinson:

The University of Akron’s Institutional Review Board for the Protection of Human Subjects (IRB) completed a review of the protocol entitled “The Effect of Individual Differences on Training Process Variables in a Multistage Computer-Based Training Context”. The IRB application number assigned to this project is 2006-1103.

The protocol was reviewed on November 10, 2006 and qualified for exemption from continuing IRB review. The protocol represents minimal risk to subjects and matches the following federal category for exemption:

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information is recorded in such a manner that subjects can be identified, directly or through identifiers linked to subjects; AND (ii) any disclosure of responses outside the research could reasonably place the subjects at risk of civil or criminal liability or be damaging to subjects’ financial standing, employability or reputation

Enclosed is a copy of the informed consent document, which the IRB has approved for your use in this research.

Annual continuation applications are not required for exempt projects. If you make any changes or modifications to the study’s design or procedures that either increase the risk to subjects or include activities that do not fall within one of the categories exempted from the regulations, please contact the IRB first, to discuss whether or not a request for change must be submitted. Any such changes or modifications must be reviewed and approved by the IRB prior to their implementation.

You are required to submit a Final Report to the IRB, upon completion of this research.

Please retain this letter for your files. If the research is being conducted for a master’s thesis or doctoral dissertation, the student must file a copy of this letter with the thesis or dissertation.

Sincerely,

Sharon McWhorter
Interim Director

Cc: Dennis Doverspike, Advisor
    Rosalie Hall, IRB Chair