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RESEARCH REPORT

When Big Brother Is Watching: Goal Orientation Shapes Reactions to Electronic Monitoring During Online Training

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Web-based training is frequently used by organizations as a convenient and low-cost way to teach employees new knowledge and skills. As web-based training is typically unproctored, employees may be held accountable to the organization by computer software that monitors their behaviors. The current study examines how the introduction of electronic performance monitoring may provoke negative emotional reactions and decrease learning among certain types of e-learners. Through motivated action theory and trait activation theory, we examine the role of performance goal orientation when e-learners are exposed to asynchronous and synchronous monitoring. We show that some e-learners are more susceptible than others to evaluation apprehension when they perceive their activities are being monitored electronically. Specifically, e-learners higher in avoid performance goal orientation exhibited increased evaluation apprehension if they believed asynchronous monitoring was present, and they showed decreased skill attainment as a result. E-learners higher on prove performance goal orientation showed greater evaluation apprehension if they believed real-time monitoring was occurring, resulting in decreased skill attainment.

Keywords: goal orientation, computer-mediated learning, electronic performance monitoring, motivated action theory, trait activation

Web-based training is becoming increasingly common in today's organizations. The use of technology-delivered training such as video conferences and Internet-based courses is being explored by many organizations (Salas & Cannon-Bowers, 2001). The *2010 State of the Industry Report* published by the American Society for Training and Development indicated that e-learning activities (i.e., nonnetworked computer-based training, online training, and training delivered via mobile devices) accounted for more than one third of overall learning activities in 2009. The increasing use of technology-mediated training is likely due to the many advantages it offers for both learners and organizations, such as reduced costs (particularly if trainees are geographically distributed) and training schedule flexibility.

Learning in technology-mediated (e.g., web-based) training has received concerted research attention (e.g., Brown, 2001; Sitzmann, 2011; Sitzmann, Kraiger, Stewart, & Wisher, 2006). The current study extends prior work by focusing on the role of affective (i.e., emotional) responses to training as a potential inhibitor of learning in technology-mediated training. The emotions e-learners experience while training likely play a role in how much they ultimately learn (Bell & Kozlowski, 2010). Researchers have argued that emotions, such as anxiety, increase mental workload and reduce attentional resources available for the learning task (Kanfer & Ackerman, 1990; Reason, 1990; Wood, Kakebeeke, Debowski, & Frese, 2000). Similarly, evaluation apprehension (i.e., anxiety due to the presence of others) can adversely affect training outcomes such as knowledge and skill acquisition (Zeidner & Matthews, 2005). Certain traits are likely to predispose people to evaluation apprehension during training, especially when others are monitoring their progress. Understanding the influence of monitoring learners' choices and behaviors on their anxiety is particularly relevant, given the trend toward electronic monitoring, particularly web-based training (WBT) in the workplace.

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The purpose of the current study was to examine the extent to which the introduction of electronic monitoring causes certain types of trainees (namely, those concerned about self-presentation) to experience greater anxiety during training and, ultimately, poorer learner outcomes relative to others. The psychology behind this phenomenon can be understood through a general framework for self-regulated behavior in learning contexts, which is described next. We focus on trait performance goal orientations as key antecedents of learners' affective reactions to electronically monitored WBT (see Figure 1). Next, we develop hypotheses linking performance goal orientations to state evaluation apprehension and skill attainment. We then define and distinguish between two different types of electronic performance monitoring and hypothesize their influence on the aforementioned relationships.

Self-Regulation in Learning Contexts

Much of the extant literature on learner behavior in achievement contexts centers on the notion of self-regulation (Diefendorff & Lord, 2008). According to Vancouver and Day (2005), self-regulation entails "processes involved in attaining and maintaining (i.e., keeping regular) goals, where goals are internally represented (i.e., within the self) desired states" (p. 158). Drawing from theories of self-regulation (e.g., Carver & Scheier, 1998) and information processing (e.g., Kanfer & Ackerman, 1989), motivated action theory (MAT; DeShon & Gillespie, 2005) provides a useful framework for understanding learner behavior in achievement contexts. MAT posits that individuals' behavior in achievement situations is guided by the pursuit of goals interwoven into complex hierarchies. At the peak of these hierarchies are self goals universal to all individuals, such as agency, esteem, and affiliation. To achieve these abstract self goal outcomes, individuals act to accomplish more specific principle goals (e.g., personal growth, social value, structure) such that discrepancies between the current and goal self are reduced. Below the principle goals in the MAT hierarchy, and also the point in the hierarchy most relevant to achievement settings, such as a training context, are the achievement goals (DeShon & Gillespie, 2005). When these achievement goals are accepted and consistently activated by an individual, they reflect an orientation or trait that ultimately influences self-regulation (Cellar et al., 2011). One of the traits highly relevant to a learning environment is dispositional goal orientation. MAT and previous conceptualizations of goal orientation provide insight into how learners may respond in a monitored training environment.

Achievement goals, such as mastery and performance goals (e.g., Dweck, 1986), are set in pursuit of one's principle goals. Achievement goal *orientation* describes the patterns of cognition and behaviors individuals exhibit in pursuit of the principle goals most salient (or activated) in the learning context. Goal orientation theory (Dweck, 1986) describes two general approaches to achievement goals learners tend to pursue across learning situations. Some learners tend to prioritize skill mastery (i.e., learning goal orientation [LGO]) in learning situations, whereas others prioritize task performance either to prove their ability to others or avoid negative judgments about their ability (DeShon & Gillespie, 2005; VandeWalle, 1997). Scholars distinguish between two types of performance goal orientation. *Prove performance goal orientation* (PPGO) refers to the extent to which individuals are motivated to demonstrate their capabilities to others, seeking positive affirmation about their behaviors and abilities (VandeWalle, 1997). In contrast, *avoid performance goal orientation* (APGO) reflects an individual's tendency to avoid tasks and situations that could engender negative judgments from others (VandeWalle, 1997). Although individuals' achievement goals can vary across learning contexts, DeShon and Gillespie (2005) stated individuals have chronically active goals, resulting in "similar patterns of goal activation. . .each time the individual encounters the situation" (p. 1114). Individuals with chronically active (or trait) performance goals tend to pursue such goals across achievement contexts.

Goal Orientations and Evaluation Apprehension

Research on the linkage between goal orientation and evaluation apprehension is lacking in training contexts. Historically, this type of research has tended to focus on testing contexts. For example, performance goal orientations have been shown to positively relate to test anxiety (e.g., Eum & Rice, 2011). We expect a similar pattern to occur in the context of a demanding WBT program. Whereas PPGO and APGO represent distinct patterns of cognition and action, both are expected to increase the level of evaluation apprehension people experience during an e-learning task. *Evaluation apprehension* refers to distress and unease due to concerns about negative appraisals of others in an evaluative situation (Zeidner,

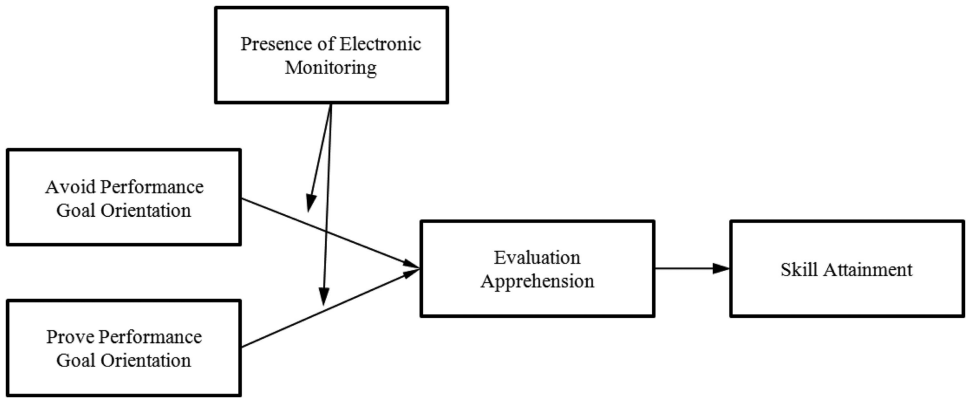

Figure 1. Conceptual model linking performance goal orientations to skill attainment.

1998).[1] Both performance orientations reflect a primary concern for self-presentation, resulting from an individual's desire to gain the respect of others (and ultimately affiliation and esteem). Thus, a chronically active (or trait) performance goal may be an antecedent of state evaluation apprehension (Zeidner & Mathews, 2005). A distinguishing characteristic of individuals who exhibit performance orientations is their tendency to conceptualize abilities as stable (i.e., not subject to improvement), believing increased effort when faced with difficulty will not improve their performance (Dweck, 1986; Elliott & Dweck, 1988). When faced with novel or challenging learning content, in which learner progress or performance will be evaluated, performance-oriented individuals are expected to experience performance-related anxiety. Although both high-APGO and high-PPGO individuals are expected to experience evaluation apprehension, the behaviors these individuals exhibit in response to the learning situation will likely differ.

In their review of self-regulatory models of evaluation anxiety, Zeidner and Mathews (2005) identify avoidant motivations and coping strategies (e.g., APGO) as antecedents of state evaluation anxiety. Indeed, meta-analytic findings have supported the positive relationship between APGO and state anxiety (Payne, Youngcourt, & Beaubien, 2007). The finding that learners high on APGO tend to avoid performance feedback (Payne et al., 2007) is also consistent with the notion that these individuals are apprehensive of such evaluations. High-APGO learners are thought to avoid feedback because these learners interpret negative feedback as indicative of low competence (Elliot & Harackiewicz, 1996; VandeWalle & Cummings, 1997). Put in a situation in which they are asked to perform challenging tasks, high-APGO learners are expected to appraise their performance negatively and experience increased anxiety.

Hypothesis 1: APGO will positively predict evaluation apprehension.

Like APGO, PPGO results from an individual's concern for self-presentation and desire to gain the respect of others. Like APGO, PPGO is also expected to result in evaluation apprehension. Meta-analytic findings support this claim, showing an overall positive relationship between PPGO and state anxiety in learning and job contexts (Payne et al., 2007). To avoid potential failure, high-PPGO individuals direct effort toward maximizing task performance. For high-PPGO learners, evaluation apprehension is likely conditional on the difficulty (either perceived or actual) of the performance task. As noted earlier, people with higher PPGO tend to conceptualize their abilities as fixed (Dweck, 1986). Given their desire to demonstrate task competence to others, high-PPGO learners are likely to experience unease and anxiety when faced with a challenging or novel task (Elliott & Dweck, 1988). Thus, it is expected that high-PPGO learners will experience greater evaluation apprehension than low-PPGO learners.

Hypothesis 2: PPGO will positively predict evaluation apprehension.

In contrast to performance goal orientations, LGO is not expected to relate to evaluation apprehension in achievement settings. High-LGO learners use an internal referent (i.e., personal attainment) to gauge progress toward achievement goals rather than an external referent (e.g., others' performance, normative performance expectations; Dweck, 1986). Given their willingness to receive external feedback on their learning, learners high in LGO are not expected to experience any more unease or discomfort with the prospect of others evaluating their performance than low-LGO individuals. Therefore, LGO is not expected to relate to evaluation apprehension.

Evaluation Apprehension and Learning

Evaluation apprehension has implications for learning. In their model of training effectiveness, Gully and Chen (2010) cite learners' emotional states (e.g., anxiety) during training as antecedents of learning. Research on the social facilitation effect (Zajonc, 1965) has also established the negative influence of evaluation apprehension on task performance and skill attainment. The social facilitation effect, as defined by Geen and Gange (1977), posits that the presence of others in a learning or performance environment produces arousal, which in turn energizes dominant responses (e.g., successful performance for easy tasks, error-prone performance for difficult tasks), to the detriment of performance when working on a difficult task. When one is being observed or monitored, performance can be hindered by distraction and evaluation apprehension. Evaluation apprehension triggers off-task cognitive processes and self-monitoring (Kanfer & Ackerman, 1989), diverting attentional resources away from the on-task processing (Zeidner & Mathews, 2005).

The anxiety–performance relationship has been well established, with meta-analytic studies reporting population correlations of approximately −.20 (cf. Zeidner & Mathews, 2005). Considering the aforementioned rationale and empirical evidence, evaluation apprehension experienced during training is expected to negatively predict skill outcomes.

Hypothesis 3: Evaluation apprehension will negatively predict skill attainment.

Mediating Role of Evaluation Apprehension

Prior research has established a small to moderate negative correlation between trait APGO and learning (Payne et al., 2007). Evaluation apprehension likely plays an intervening role between APGO and learning. APGO results from chronically active goals that result in a distinctive pattern of cognition and behavior in learning situations (DeShon & Gillespie, 2005). For high-APGO learners, this pattern is characterized by negative appraisals of one's immediate and future performance (Payne et al., 2007) and evaluation anxiety (Zeidner & Mathews, 2005). These task distractions result in cognitive "disorganization" (Dierdorff & Ellington, 2012; Rawsthorne & Elliot, 1999) and impede the learning process. According to Zeidner and Mathews (2005), "negative self-appraisals and outcome expectancies generate cognitive interference associated with worry that leads to acute performance deficits" (p. 159). In addition to diverting attentional resources to off-task concerns, negative self-appraisals and emotional reactions may trigger avoidant coping strategies whereby learners withdraw

[1] The current study focuses on the transient state conceptualization of evaluation apprehension, as opposed to trait-based conceptualizations (e.g., Speilberger, Anton, & Bedell, 1976).

from performance tasks (Zeidner & Mathews, 2005). The cognitive interference and task avoidance associated with evaluation apprehension are expected to be the primary mechanisms through which APGO negatively influences learning.

> *Hypothesis 4:* Evaluation apprehension will mediate the relationship between APGO and skill attainment, such that higher APGO will result in higher evaluation apprehension and subsequently lower skill attainment.

PPGO is also expected to increase evaluation apprehension and, in turn, decrease skill attainment. To fulfill their goal to appear competent on the task, high-PPGO learners seek to avoid negative appraisals by devoting maximal effort to observable performance, while simultaneously minimizing the visible effort required to perform the task (DeShon & Gillespie, 2005; Dweck, 1986). In directing attentional resources toward performance outcomes, high-PPGO learners reduce resources for learning the task (Kanfer & Ackerman, 1989). High PPGO has been linked to increased anxiety (G. Chen, Gully, Whiteman, & Kilcullen, 2000; Payne et al., 2007), which can lead to reduced self-efficacy and on-task processing (G. Chen et al., 2000; Payne et al., 2007; Phillips & Gully, 1997) and increased cognitive interference (Hofmann, 1993). Increased concern for how one is performing diverts attention away from core learning activities (Beier & Kanfer, 2010; Dierdorff & Ellington, 2012; Yeo, Loft, Xiao, & Kiewitz, 2009). Therefore, the pattern of cognition and behavior associated with high PPGO will include elevated performance anxiety, which will trigger coping mechanisms that drain cognitive resources necessary for learning the task.

> *Hypothesis 5:* Evaluation apprehension will mediate the relationship between PPGO and skill attainment, such that higher PPGO will result in higher evaluation apprehension and subsequently lower skill attainment.

Electronic Performance Monitoring

The training conditions faced by high-APGO and PPGO e-learners may also play a role in their affective response and learning during training. Electronic performance monitoring (EPM), the collection and storage of information from an individual's computer, allows trainees' actions and performance to be recorded (e.g., Aiello & Svec, 1993; Attewell, 1987; Nebeker & Tatum, 1993). Computerized monitoring can provide supervisors with access to rich information about employees' progress through training with greater efficiency and reliability than may be possible in a live proctored setting, through means that are relatively easy to implement (Peters, 1999). The implementation of EPM of training activities is consistent with the more general trend toward electronic monitoring in the workplace ("Big Brother bosses," 2009). A report by the American Management Association (2007) revealed that 66% of businesses use some kind of computer monitoring, with 45% of businesses monitoring every keystroke.

Despite the extensive use of computer monitoring in the workplace, its effects on workers are not fully understood (Douthitt & Aiello, 2001). Much of the popular press on this topic (e.g., "Big Brother bosses," 2009) has focused on what can be called *asynchronous* or *archival* monitoring. Asynchronous monitoring involves tracking and storing information (e.g., e-mail, Internet usage, performance data, online training logs) for possible future reference. Meanwhile, most of the research literature (e.g., Douthitt & Aiello, 2001; Stanton, 1996; Stanton & Sarkar-Barney, 2003) has focused on the effects of synchronous, or "real-time" monitoring, which involves tracking computer users' online activities in real time as they occur. Although real-world examples of such monitoring exist (e.g., the monitoring of network activity on military installations, or observation of individuals completing work samples, or simulations for the purposes of assessment), they are not common in practice. As archival monitoring is more likely to be encountered in practice than synchronous monitoring, more research is needed to better understand the unique implications of this type of monitoring for e-learning.

Asynchronous and synchronous monitoring are conceptually distinct, raising questions about the degree to which the research literature on real-time monitoring generalizes to the common practice of archival monitoring. Two key differences between these approaches to monitoring are (a) the immediacy of the evaluation and (b) the information on which evaluations are based. With asynchronous monitoring, any review of an employee's behaviors would take place after some duration of time (e.g., hours, weeks, months)—a duration that may or may not be known to the employee. When this review occurs, evaluators would have a comprehensive record of an employee's activities with which to form judgments. With synchronous monitoring, employee behaviors are being tracked by a human observer as they occur. This implies that evaluation is also happening in real time and is based on the information the observer has recalled or is attending to at any moment. These differences raise serious questions regarding the generalizability of the extant research on the effects of monitoring in the workplace. Therefore, although our primary goal in this study was to develop a stronger theoretical understanding of the interplay between goal orientation and training conditions in e-learning settings, a secondary and complimentary goal entails examining the potential differences in the effects of asynchronous and synchronous monitoring.

Moderating Role of Electronic Monitoring

Performance goal orientations (i.e., PPGO and APGO) likely play an important role in shaping e-learners' reactions to electronic monitoring. The introduction of monitoring is expected to influence learner actions (and subsequent learning) through its influence on goal activation and expectancies underlying those actions. According to Zeidner and Mathews (2005), the "effects of anxiety on behavior are the product of not only disruptive thoughts and feelings but also the anxious person's goals for coping with perceived evaluative threats" (p. 157). The introduction of monitoring is expected to heighten the activation of emotional responses closely associated with affiliation and esteem goals. Evaluation apprehension is one such emotional response, particularly for performance-oriented learners (e.g., Deshon & Gillespie, 2005). The experience of evaluation apprehension is derived from "an implicit need of individuals to avoid criticism or negative evaluation by others" (Geen, 1991, p. 378). This need is particularly salient to performance-oriented learners, who are concerned about others' judgments of their ability. The presence of monitoring is expected to cause performance-oriented e-learners to become apprehensive about being evaluated by others.

Interactional models of anxiety (see Endler & Parker, 1992) suggest reactions to situational stressors depend on both individual traits and characteristics of the situation. Although the presence of monitoring is expected to trigger anxiety and decreased skill attainment in high-APGO and high-PPGO learners, the characteristics of monitoring may influence the magnitude of these effects. Trait activation theory (Tett & Burnett, 2003; Tett & Guterman, 2000) provides a framework for hypothesizing the effects of monitoring conditions on learner reactions. Drawing on person–situation interactionalism (e.g., Bowers, 1973; Ekehammar, 1974; Weiss & Adler, 1984), Tett and Burnett (2003) posited that "personality traits are expressed as responses to trait-relevant situational cues" (p. 502). Situations exhibit *trait relevance* if they contain cues that are thematically aligned with the trait (Tett & Guterman, 2000). Trait activation is consistent with motivated action theory by positing individuals possess chronically active goals more strongly expressed in certain situations (i.e., high trait relevance) and less strongly expressed in other situations (i.e., low trait relevance).

In the context of WBT, APGO trait relevance should be greatest for a learning task in which learners perceive their activities are being recorded with a high level of detail (i.e., asynchronous monitoring). High-APGO learners place greater value on not appearing incompetent than on learning new skills (VandeWalle, 1997). The presence of in-depth capturing and recording of learner activities would provide a cue to high-APGO learners, amplifying trait-relevant responses. These responses would include evaluation apprehension, reduced on-task processing (due to distraction), and impression management (e.g., self-monitoring). These responses are expected to be somewhat less pronounced, though still measurable, under the synchronous monitoring condition. This is because synchronous monitoring does not imply a permanent record of behavior will be archived and reviewed at a later date. Therefore, the extent of evaluation is restricted both in duration and by the attentional resources of the evaluator. WBT in which no performance monitoring is taking place is expected to incur the least negative affective response from high-APGO learners. Compared with monitored WBT, unmonitored WBT presents fewer cues relevant to APGO, which should result in reduced expression of APGO-related affective, cognitive, and behavioral responses.

> *Hypothesis 6:* The negative relationship between APGO and skill attainment, as mediated by evaluation apprehension, will be strongest when asynchronous monitoring is present, followed by synchronous monitoring and unmonitored conditions.

Research on the PPGO-learning relationship has shown inconsistent findings. Payne et al.'s (2007) meta-analysis showed an overall nonsignificant relationship between PPGO and learning. However, the lack of an overall relationship does not rule out unmeasured moderators, such as the relevance of the achievement situation to trait PPGO (e.g., Tett & Burnett, 2003; Tett & Guterman, 2000). High-PPGO learners value demonstrating task competence to other people above learning new skills (VandeWalle, 1997). In a self-directed WBT environment, gauging how well one is performing relative to others is difficult because (a) there may be no other learners with whom to compare one's performance, or (b) performance may be difficult to compare given learner control over pace and sequence. Social comparison cues allowing one to gauge performance relative to peers are sparse, likely resulting in increased anxiety in high-PPGO learners. Therefore, PPGO is expected to more strongly predict evaluation apprehension (and, indirectly, skill attainment) in monitored conditions than in unmonitored conditions.

Considering trait activation theory, WBT should exhibit more cues relevant for trait PPGO when others are present (either physically or virtually) to monitor the learner's behaviors and performance, as compared with when activities are recorded for later review or no monitoring is present. The presence of a live external monitor (i.e., synchronous monitoring) is expected to induce heightened arousal and emotional response (Zajonc, 1965). This presence would provide a clear cue to high-PPGO learners, resulting in trait-relevant responses. For high-PPGO learners, such responses would include self-presentation concerns (i.e., evaluation apprehension) and focusing effort on task performance to demonstrate competency. These trait expressions are expected to be less pronounced, though still measurable, under asynchronous monitoring due to the absence of an actual person observing learner activities. However, high-PPGO learners who perceive their activities are being recorded for later review are expected to exhibit greater levels of evaluation apprehension than those who believe no monitoring is taking place.

> *Hypothesis 7:* The negative relationship between PPGO and skill attainment, as mediated by evaluation apprehension, will be strongest when synchronous monitoring is present, followed by asynchronous monitoring and unmonitored conditions.

Method

Participants

Participants were psychology students at a large southeastern university who volunteered to take part in the study to gain course credit. A total of 153 individuals completed the training program. The mean age of the sample was 20.56 years ($SD = 5.39$), and 56% of participants were male. With regard to ethnicity, 74% of the sample was Caucasian, 13% was African American, 6% was Asian American, 3% was Hispanic, 1% was Native American, and 3% reported their ethnicity as "other." Trainees in all conditions volunteered to participate in the study via an electronic recruitment website maintained by the psychology department of the university from which the sample was drawn. A basic working knowledge of Microsoft Excel was a prerequisite for participation in this study.

Training Program

A web-based Microsoft Excel training program was created for this study. It consisted of 12 modules, each providing instructions on how to use an advanced feature of Excel. Examples include modules teaching trainees how to create array formulas, use Excel's "VLOOKUP" function, and create Pivot Tables. Pilot testing was conducted to ensure the topics chosen for the training were considered difficult and were not commonly known to the average university student possessing a working knowledge of Excel. This increased the likelihood that the material was new and appropri-

ately challenging to trainees in the study. Within each module, optional practice exercises were available to aid participants in mastering the material being taught. Participants had complete control over how much of the material they reviewed and the pace at which they reviewed it. The training program was designed such that it should take a trainee approximately 30–45 min to complete the entire program.

Design and Procedure

Data collection was conducted in an office-like laboratory on two desktop computers situated within cubicles. One computer was equipped with Excel and Personal Inspector, a commercially available computer monitoring program that collects information on all computer and Internet activity (e.g., websites visited, keystrokes, and time stamps for all actions). The second computer was unmonitored and used for pretraining and posttraining questionnaires only. All participants were specifically informed that their activity on the second computer was not monitored. Volunteers participated in the experiment one at a time. After completion of an online questionnaire consisting of several pretraining measures, participants moved to the monitored computer.

This study included one manipulated independent variable, EPM, which had three levels: no monitoring, asynchronous monitoring, and synchronous monitoring. Participants were randomly assigned to one of these conditions. The only difference between these three conditions was the description of the EPM procedures given to participants. In actuality, all participants completed the training on the same computer with the same monitoring settings enabled. All participants were monitored asynchronously using the Personal Inspector software, which was not visible to participants at any point.

Several steps were taken to make the monitoring manipulation salient and realistic. Participants were shown a monitoring manipulation screen on the computer that appeared to control a monitoring program. There were three monitoring options shown on the screen: real-time (synchronous) monitoring, archival (asynchronous) monitoring, and monitoring disabled. The experimenter explained to participants the nature of the condition under which they would be working. For the synchronous monitoring condition, participants were told that a person in another room would,

> track all keystrokes, how long you spend reading each training topic, how many practice exercises you attempt, how long you spend on each practice exercise, any errors you make while working on the training program, your efficiency, and all other Internet activity, such as checking e-mail and visiting extraneous web sites.

The presentation of the asynchronous monitoring condition was similar, but participants were told these activities were being stored on the computer for later examination, rather than being monitored by a person in another room. Experimenters also provided participants in the monitoring conditions fictitious reports of the information supposedly captured by the monitoring program. Those in the monitoring disabled condition were explicitly told that none of their computer activities would be tracked. After a complete description of these conditions was provided, participants were asked to activate the appropriate monitoring option that was chosen for them by selecting an icon on the screen.

Next, participants were linked to the introductory page of the training program. The introductory page included links to all training modules, allowing learners total control over the sequence of topics they could complete. Participants were informed that at the completion of the training, they would be given a test to measure what they learned. To ensure trainees were motivated to put effort into the program, they were informed that those with the five highest posttraining test scores would be entered into a drawing for $75. Participants were told that when they finished the training program, they were to fill out a paper-and-pencil demographic questionnaire and take it to the experimenter who was located in a different room. At this point, the experimenter left the room.

For those in the synchronous monitoring condition, experimenters waited for the participants in front of a computer with a fictitious monitoring website to reinforce the synchronous monitoring condition. After participants took the demographic questionnaires to the experimenter, they returned to the laboratory with the experimenter. Participants in the monitoring conditions watched while the experimenter turned off the monitoring program, so it was clear that no other monitoring took place for the remainder of the experiment. For the final part of the experiment, participants were asked to complete various posttraining measures on the unmonitored computer.

Pretraining Measures

Goal orientations. Goal orientation was measured using VandeWalle's (1997) work domain measure. This scale was adapted to refer to the academic domain to be more appropriate for this undergraduate sample. Five items ($\alpha = .85$) were used to assess LGO (e.g., "I often look for opportunities to develop new skills and knowledge"). A four-item scale ($\alpha = .85$) was used to assess PPGO (e.g., "I like to show that I can perform better than my classmates"). APGO was also measured using a four-item scale ($\alpha = .86$) with items such as "Avoiding a show of low ability is more important to me than learning a new skill." Responses were indicated on a 1 (*strongly disagree*) to 5 (*strongly agree*) Likert-type scale. Responses were averaged to form composite scores for each scale.

Posttraining Measures

Evaluation apprehension (nine items, $\alpha = .92$). Trainees were asked to provide ratings of the degree to which they experienced evaluation apprehension during the training program. This variable was measured with a scale adapted from Leary (1983). An example item is, "During the training program, I worried about what other people would think of me." A 1 (*strongly disagree*) to 5 (*strongly agree*) Likert-type rating scale was used to respond to these items. Reverse-coded items were reverse scored, and responses to this scale were subsequently averaged. Scale scores could therefore range between 1 and 5, with higher values reflecting greater levels of evaluation apprehension.

Skill attainment (14 items). Participants' skill attainment was assessed with an objective, hands-on skills test containing Excel spreadsheets that were similar to the training materials. Instructions on the spreadsheets directed participants to perform specific functions related to the training material. An example test item is,

"Insert a formula in cell D12 using the IF function that will sum cells C3 through C10 (also written as C3:C10) only if the average of (B3:B10) is greater than 1000. Otherwise, have the formula return a 0."

Test items were scored as either correct (0) or incorrect (1), with no partial credit awarded. A random subset of 15 of the tests was scored independently by four raters. The scoring method had uniformly high reliability (ICC[A,1] = .92–1.00).[2] Thus, the remaining tests were scored by one rater. We summed the points earned by each individual to create a skill attainment score for analysis. Posttraining skills test scores could therefore range between 0 and 14, with greater values reflecting greater skill levels. Skills test scores were available for 143 participants.

Background and manipulation checks. The training program was designed to cover program features that would be unfamiliar to most participants, increasing the challenge of the learning task. Eight items (α = .80) were developed to assess participants' prior familiarity with the Excel content covered in the training. Prior to beginning training, participants indicated the extent to which they could perform each training task when presented with fictitious spreadsheets. An example item included, "I already know how to use Excel's filter function to view information for 'Travel Gear' alone while eliminating the other information from sight." Responses used a Likert-type scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A mean composite was created, such that higher values represented a higher self-assessed skill level.

Four items (α = .96) were developed to determine how confident participants were that they were being electronically monitored synchronously while working on the training program. Four additional items (α = .85) were used to determine participants' perceptions that their activities were asynchronously monitored. These items asked participants to use a 100-point percentage scale to rate their confidence in statements such as, "In between 0 and 100 percent, what do you think the probability is that someone on another computer was observing how many practice exercises you attempted while you worked on the training program?"

Control variable. Given prior research showing gender differences in evaluation apprehension (see Zeidner & Mathews, 2005), trainee gender was used as a control.

Analysis

Moderated mediation modeling (e.g., Edwards & Lambert, 2007; Preacher, Rucker, & Hayes, 2007) was used to evaluate the study hypotheses and research questions. Analyses were conducted using maximum likelihood estimation in Mplus (Muthén & Muthén, 1998–2010). Formal significance tests of the indirect effect *ab* (e.g., Shrout & Bolger, 2002) were used to evaluate mediation hypotheses. We used the procedure detailed by Preacher et al. (2007) to evaluate the moderating role of EPM condition on the indirect effects from goal orientations to skill attainment. We used the bias-corrected bootstrap to evaluate the significance of each indirect effect (and contrasts between indirect effects), as recommended by methodologists in this area (Edwards & Lambert, 2007; MacKinnon, Lockwood, & Williams, 2004; Preacher et al., 2007; Shrout & Bolger, 2002).

We estimated a simple mediation model and a moderated mediation model separately for LGO, APGO, and PPGO. For the first stage of each model, evaluation apprehension was first regressed onto the focal predictor and monitoring condition (Step 1), with the interaction between the focal predictor and monitoring condition added in Step 2. Monitoring condition was dummy-coded, with the unmonitored condition serving as the reference group. The focal predictor was standardized prior to computing the product terms for the interaction (Cohen, Cohen, West, & Aiken, 2003). Gender was also entered as a control. For the second stage of each model, skill attainment was first regressed onto the focal predictor, monitoring condition, and gender, as well as evaluation apprehension (Step 1). In Step 2, the interaction between the focal predictor and monitoring condition was included. Each path model was fully saturated (i.e., had 0 degrees of freedom), yielding perfect model fit to the data and unbiased indirect effect estimates (Preacher et al., 2007).

To ensure the current sample provided adequate power to detect mediation, we referred to prior simulation studies on this issue. Fritz and MacKinnon (2007) investigated the sample size required to detect indirect effects using the bias-corrected bootstrap method. These authors found that for a sample of 148 (approximate size of the current sample), the bias-corrected bootstrap had adequate power (.80) to detect indirect effects for which the first- and second-stage paths were small to medium in magnitude or larger. Therefore, statistical power for this study was adequate to detect even modest indirect effects.[3]

Results

Background Analyses

On average, respondents' self-assessed skill level on the training content was low as indicated by a sample mean (M = 2.17, SD = .78), which was significantly lower than the midpoint of "3" on the pretraining self-assessment scale, $t(152) = -13.12$, $p < .001$. This indicated that participants were generally unfamiliar with the training content prior to this experiment. To examine the efficacy of the experimental manipulation, two one-way analyses of variance with follow-up pairwise comparisons were conducted. We first examined learners' perceptions of the presence of asynchronous monitoring as the dependent variable, followed by perceptions of synchronous monitoring. Results demonstrated that the manipulations were successful. Those in the asynchronous monitoring condition were significantly ($p < .05$) more likely than learners in both of the other conditions to believe their training activities were being archived for future reference ($M_{[asynchronous]}$ = 88.4, SD = 16.1; $M_{[synchronous]}$ = 70.7, SD = 26.2; $M_{[no\ monitoring]}$ = 51.6, SD = 31.3). In addition, those in the synchronous monitoring condition were significantly ($p < .05$) more likely than learners in the other two conditions to believe their activities were being actively monitored by an observer during training ($M_{[synchronous]}$ = 68.7, SD = 30.1; $M_{[asynchronous]}$ = 55.8, SD = 31.2; $M_{[no\ monitoring]}$ = 32.1, SD = 30.2).

[2] See McGraw and Wong (1996) for computational details for two-way mixed model ICC(A,1).

[3] *Small to medium* is defined as 7.5% of variance accounted for, halfway between Cohen's (1988) criteria for a small (2% of the variance) and medium (13% of the variance) effect.

Given the centrality of evaluation apprehension, PPGO, and APGO to this study's hypotheses, a confirmatory factor analysis was conducted to examine the discriminant validity of these three self-report scales. Model fit for the a priori three-factor model (comparative fit index [CFI] = .93, Tucker-Lewis Index [TLI] = .91, root-mean-square error of approximation [RMSEA] = .07, standardized root-mean-square error [SRMR] = .06) was significantly improved, $\Delta\chi^2(3) = 490.52$, $p < .001$, ΔCFI = .38, compared with a one-factor model (CFI = .55, TLI = .48, RMSEA = .18, SRMR = .16). Additionally, a two-factor model combining evaluation apprehension and PPGO items (CFI = .73, TLI = .69, RMSEA = .14, SRMR = .13) exhibited poorer fit than the a priori model, $\Delta\chi^2(2) = 248.93$, $p < .001$, ΔCFI = .20. Lastly, a two-factor model combining evaluation apprehension and APGO items (CFI = .72, TLI = .68, RMSEA = .14, SRMR = .13) showed poorer fit than the a priori model, $\Delta\chi^2(2) = 265.00$, $p < .001$, ΔCFI = .21.

Tests of Mediation

The means, standard deviations, and intercorrelations for variables relevant to the study hypotheses are presented in Table 1. Results for Hypothesis 1 are presented in Table 2. In support of Hypothesis 1, APGO was positively associated with evaluation apprehension ($\beta = .19$, $z = 3.21$, $p < .01$). Table 3 presents the results for Hypothesis 2. Supporting Hypothesis 2, PPGO was positively associated with evaluation apprehension ($\beta = .15$, $z = 2.80$, $p < .01$).

Evaluation apprehension was negatively related to skill attainment, as shown in Table 2 (Step 1; $\beta = -.82$, $z = -2.45$, $p < .01$) and Table 3 (Step 1; $\beta = -.97$, $z = -2.63$, $p < .01$). Thus, Hypothesis 3 was supported. Regarding the simple mediation hypotheses, results presented in Table 4 show a negative indirect effect from APGO to skill attainment through evaluation apprehension ($ab_{[APGO]} = -.15$). The bootstrapped 95% confidence interval around this indirect effect did not include zero ($-.38$, $-.02$), supporting Hypothesis 4. Results also showed a negative indirect effect ($ab_{[PPGO]} = -.15$) from PPGO to skill attainment (see Table 6). The bootstrapped confidence interval did not include zero ($-.37$, $-.03$), supporting Hypothesis 5.

Tests of statistical significance do not allow one to "support" a hypothesis of a null relationship. We therefore refrained from hypothesizing a null LGO–evaluation apprehension relationship. However, to confirm that the phenomena at hand are operating as expected, this study's hypothesis testing was supplemented with analyses to determine whether performance goal orientations are more strongly associated with evaluation apprehension than is learning goal orientation. LGO was found to be unrelated to evaluation apprehension (see Table 4), supporting the notion that performance goal orientations are relatively more important to the experience of such anxiety.

Tests of Moderated Mediation

Table 2 presents results for the first stage of the moderated mediation regression for APGO.[4] Results showed the APGO slope on evaluation apprehension was significantly greater for the asynchronous monitoring condition compared with the unmonitored condition, as evidenced by the significant cross-product between APGO and the dummy code for the asynchronous monitoring condition ($\beta = .34$, $z = 2.48$, $p < .01$). Figure 2 graphically depicts the APGO–monitoring type interaction. To evaluate Hypothesis 6, the conditional indirect effect of APGO on skill attainment was estimated for each monitoring condition. As shown in Table 5, the indirect effect for APGO was statistically significant and negative for the asynchronous monitoring condition ($ab_{[APGO,\ asynchronous]} = -.30$) and the synchronous monitoring condition ($ab_{[APGO,\ synchronous]} = -.16$). However, the indirect effect for APGO was not significant for the unmonitored condition ($ab_{[APGO,\ no\ monitoring]} = -.03$).

Contrasts were performed to determine whether the conditional indirect effects for the monitored conditions differed significantly from that of the unmonitored condition. As shown in Table 5, the indirect effect for APGO in the asynchronous monitoring condition was significantly more negative than that for the unmonitored condition ($ab_{[APGO,\ asynchronous]} - ab_{[APGO,\ no\ monitoring]} = -.27$, 95% bootstrap CI [$-.72$, $-.02$]). The indirect effect for the synchronous monitoring condition did not significantly differ from that of the unmonitored condition. Therefore, Hypothesis 6 was partially supported.

Table 3 shows the results for the first-stage moderated mediation regression for PPGO. The slope for PPGO on evaluation apprehension was significantly greater for the synchronous monitoring condition compared with the unmonitored condition, as shown by the significant cross-product between PPGO and the dummy code for the synchronous monitoring condition ($\beta = .28$, $z = 1.96$, $p < .05$). The PPGO–monitoring type interaction is depicted graphically in Figure 3. Conditional indirect effects for PPGO were estimated for each monitoring condition (see Table 6). The indirect effect was significant and negative for the asynchronous monitoring condition ($ab_{[PPGO,\ asynchronous]} = -.16$)[5] and the synchronous monitoring condition ($ab_{[PPGO,\ synchronous]} = -.29$). The indirect effect of PPGO on skill attainment was not significant in the unmonitored condition ($ab_{[PPGO,\ no\ monitoring]} = -.02$).

As shown in Table 6, the indirect effect for the asynchronous monitoring condition did not significantly differ from that of the unmonitored condition. However, the indirect effect for PPGO in the synchronous monitoring condition was significantly more negative than that for the unmonitored condition ($ab_{[PPGO,\ asynchronous]} - ab_{[PPGO,\ no\ monitoring]} = -.27$, 95% bootstrap CI [$-.75$, $-.03$]). Thus, Hypothesis 7 was partially supported.

[4] We analyzed the moderated-mediation path model separately for each goal orientation measure in order to achieve as close to 10 observations per estimated parameter as possible (as recommended by Klein, 1998) and to avoid excessive multicollinearity introduced by having multiple sets of interaction terms (Cohen et al., 2003), ensuring stability of model estimates. However, doing so did not adjust for potential overlap among the goal orientation measures. Given the observed nonzero relationships among goal orientations and the potential of capitalizing on sampling error, we reestimated each model controlling for the direct effects of the other two goal orientation measures on the mediator and learning outcome. Partialing out the main effects of the other goal orientation measures did not change the direction or significance of the model parameters for APGO, PPGO, or LGO. Therefore, the findings were unaffected by this modeling decision.

[5] The upper 5% limit of the bootstrap confidence interval ($-.02$) was less than zero, indicating a significant, one-tailed finding given the directional nature of the hypothesis.

Table 1
Descriptive Statistics and Correlations

Variable	*M*	*SD*	1	2	3	4	5	6	7	8[a]	9
1. Unmonitored condition	.33	.47	—								
2. Asynchronous condition	.33	.47	−.50**	—							
3. Synchronous condition	.33	.47	−.50**	−.50**	—						
4. PPGO	3.40	.85	.05	−.08	.03	—					
5. APGO	2.82	.86	.01	−.01	.01	.40**	—				
6. LGO	3.73	.70	.03	.05	−.07	.17*	−.17*	—			
7. Evaluation apprehension	2.07	.77	−.15	.05	.10	.20*	.24**	.11	—		
8. Skill attainment[a]	9.04	3.01	−.07	.10	−.03	.10	−.10	.08	−.20*	—	
9. Gender (female = 0, male = 1)	.56	.50	.15	−.05	−.10	−.05	−.01	−.20**	−.24**	−.03	—

Note. $N = 153$. Experimental conditions were dummy coded as 0 or 1. PPGO = prove performance goal orientation; APGO = avoid performance goal orientation; LGO = learning goal orientation.
[a] = 143.
* $p < .05$. ** $p < .01$.

Discussion

The current study enhances our understanding of how state goals and self-regulation operate in a training context realistic to today's work environment by examining the relationship between goal orientation, evaluation apprehension, skill attainment, and learning environment. MAT posits that people have chronically active goals (i.e., dispositional goal orientation) that influence their reactions to the learning environment, and ultimately their behaviors. Our research supported this notion and further examined how learning context (i.e., EPM) can impact these relationships. The current findings suggest performance goal orientations lead to lower skill attainment during electronically monitored WBT through the effects of evaluation apprehension.

As was expected, those individuals with high-performance goal orientations (i.e., PPGO and APGO) showed higher levels of evaluation apprehension than those with low-performance goal orientations, whereas learning goal orientation was unrelated to evaluation apprehension. Given that individuals with high levels of evaluation apprehension demonstrated lower levels of learning in this study, the role of goal orientation in the design of training programs should not be ignored.

By understanding contextual variables that mitigate or exacerbate the effects of goal orientation, not only will we gain a better understanding of goal orientation and self-regulation in the work training environment, we will gain an awareness of steps that can be taken by organizations to optimize employee skill attainment. Performance monitoring is an important contextual variable that impacted the relationship between goal orientation, evaluation apprehension, and skill attainment. When e-learners believed no monitoring was taking place, APGO and PPGO were unrelated to evaluation apprehension and skill attainment. However, when e-learners perceived EPM was taking place, learners high in APGO and PPGO experienced elevated levels of evaluation apprehension, which in turn led to poor performance on the skill attainment measure.

As expected, LGO showed a weaker relationship with evaluation apprehension than the performance goal orientations. In fact, LGO showed no relationship to evaluation apprehension, regardless of learners' perceptions of EPM. This finding is consistent with theory, in that LGO reflects a primary concern for one's personal growth, whereas APGO and PPGO reflect a primary concern for how one is perceived (or evaluated) by others (Dweck, 1986; VandeWalle & Cummings, 1997).

The negative impact of APGO on evaluation apprehension and skill attainment was most pronounced when learners were told a broad range of activities would be recorded and reviewed after the training session concluded (i.e., the asynchronous monitoring condition). High-APGO learners likely experienced heightened anxiety in this condition due to the perceived breadth, depth, and permanence of the training logs. Such detailed behavioral tracking makes it difficult for individuals to avoid being evaluated on the skills they perceive to be weak. However, low-APGO learners did not react as negatively to such in-depth behavior tracking, as these individuals are not particularly concerned with errors or other indicators of skill deficits (e.g., slow progression) being visible to others.

In contrast, the negative impact of PPGO on apprehension and skill attainment was most pronounced in the synchronous monitoring condition. In this condition, learners perceived their activities were being tracked in real time by a live observer. Participants were told this observer was in a separate room monitoring learner actions through live screen capture.[6] This type of EPM likely elicited the strongest evaluation apprehension response in high-PPGO learners because they (a) perceived their performance was being continuously evaluated and (b) had no normative standard with which to compare their performance (because they completed the task alone and at their own pace). High-PPGO learners tend to be motivated by demonstrating their competence to others through task performance with a minimum level of visible effort (DeShon & Gillespie, 2005). When progress through a novel learning task is continuously evaluated, high-PPGO learners may feel the need to balance their desire to move quickly through the instructional content, but not so quickly that they fail to acquire the knowledge needed to perform well on learning assessments. The absence of a normative standard of performance makes this balance more difficult to achieve because it is unclear how quickly one should progress or what the performance expectations are for achieving a positive appraisal from the real-time observer.

[6] A screen capture window appeared in the fictitious sample-monitoring log shown to participants prior to training.

Table 2
Path Analytic Results for APGO

	First stage (dependent variable = evaluation apprehension)						Second stage (dependent variable = skill attainment)					
	Step 1			Step 2			Step 1			Step 2		
Variable	*a*	*SE*	*z*	*a*	*SE*	*z*	*b*	*SE*	*z*	*b*	*SE*	*z*
Gender	−.33	.12	−2.82**	−.36	.12	−3.04**	−.42	.51	−.82	−.40	.55	−.73
Asynchronous (Asynch.)	.17	.14	1.19	.17	.15	1.13	.77	.60	1.29	.77	.60	1.28
Synchronous (Synch.)	.20	.14	1.42	.20	.13	1.46	.30	.61	.49	.31	.68	.45
APGO[a]	.19	.06	3.21**	.04	.08	.44	−.15	.26	−.58	−.04	.49	−.08
APGO × Asynch.				.34	.14	2.48**				−.20	.62	−.31
APGO × Synch.				.17	.12	1.38				−.21	.65	−.32
Evaluation apprehension							−.82	.33	−2.45**	−.79	.37	−2.17*

Note. $N = 153$. Unstandardized coefficients are presented. APGO = avoid performance goal orientation.
[a] The unmonitored condition was coded as the reference group for the categorical moderator variable. Therefore, the main effect for APGO represents the slope for the unmonitored condition (Cohen et al., 2003).
* $p < .05$. ** $p < .01$.

Implications for Theory

This study adds to the extant literature on MAT and goal orientation in training by empirically demonstrating that learners' emotional reactions (i.e., evaluation apprehension) during training act as a mechanism through which goal orientations influence learning. With some exceptions (e.g., Bell & Kozlowski, 2008), there is a dearth of research addressing the role of affect in training (Bell & Kozlowski, 2010). The current findings revealed the effects of both APGO and PPGO on skill attainment were mediated by evaluation apprehension. This is consistent with theory (e.g., MAT). Specifically, our results support the expectation that those with naturally high-activation levels for stress reaction and impression management would be more sensitive to the introduction of salient performance evaluations in the training environment than those individuals who have not activated those same goals. Evaluation apprehension, in turn, has been shown to relate negatively to performance (cf. Zeidner & Mathews, 2005). Anxiety over how one is perceived by others diverts attentional resources away from on-task processing, to the detriment of learning and performance.

This study also adds to the knowledge base of contextual influences on learner performance. The importance of context to learning and transfer has been established in numerous reviews and models of training effectiveness (see Alvarez, Salas, & Garofano, 2004; Baldwin & Ford, 1988; Colquitt, LePine, & Noe, 2000). Performance monitoring constitutes a unique and understudied aspect of the learning context that may influence the way learners approach and ultimately learn from WBT. Examining how certain types of learners respond to different performance-monitoring practices adds to the growing literature on attribute-treatment interactions (ATIs) in learning contexts (Campbell & Kuncel, 2002; Gully & Chen, 2010). Training research on ATIs examines the interplay between individual characteristics and aspects of the environment (i.e., the training system), evaluating potential differential effects of interventions and training conditions across subgroups of trainees. Scholars have suggested the effects of electronic monitoring depend on the characteristics of those whom are monitored (Alder & Ambrose, 2005; J. V. Chen & Ross, 2007). The current findings suggest the relationships between performance goal orientations and training outcomes documented in

Table 3
Path Analytic Results for PPGO

	First stage (dependent variable = evaluation apprehension)						Second stage (dependent variable = skill attainment)					
	Step 1			Step 2			Step 1			Step 2		
Variable	*a*	*SE*	*z*	*a*	*SE*	*z*	*b*	*SE*	*z*	*b*	*SE*	*z*
Gender	−.32	.12	−2.58**	−.31	.12	−2.65**	−.38	.54	.71	−.38	.50	−.76
Asynchronous (Asynch.)	.19	.16	1.25	.19	.14	1.33	.91	.59	1.55	.89	.60	1.49
Synchronous (Synch.)	.21	.13	1.58	.19	.14	1.36	.33	.66	.49	.33	.61	.54
PPGO[a]	.15	.06	2.80**	.02	.09	.26	.46	.27	1.68	.62	.39	1.60
PPGO × Asynch.				.15	.14	1.07				−.38	.57	−.66
PPGO × Synch.				.28	.14	1.96*				−.11	.63	−.18
Evaluation apprehension							−.97	.37	−2.63**	−.95	.33	−2.89**

Note. $N = 153$. Unstandardized coefficients are presented. PPGO = prove performance goal orientation.
[a] The unmonitored condition was coded as the reference group for the categorical moderator variable. Therefore, the main effect for PPGO represents the slope for the unmonitored condition (Cohen et al., 2003).
* $p < .05$. ** $p < .01$.

Table 4
Path Analytic Results for LGO

Variable	First stage (dependent variable = evaluation apprehension)						Second stage (dependent variable = skill attainment)					
	Step 1			Step 2			Step 1			Step 2		
	a	*SE*	*Z*	*a*	*SE*	*z*	*b*	*SE*	*z*	*b*	*SE*	*z*
Gender	−.31	.13	−2.42*	−.32	.13	−2.53*	−.32	.56	−.58	−.45	.58	−.77
Asynchronous (Asynch.)	.16	.16	1.06	.17	.15	1.09	.82	.59	1.38	.85	.60	1.43
Synchronous (Synch.)	.22	.14	1.57	.23	.14	1.65	.38	.67	.56	.39	.68	.57
LGO[a]	.06	.06	.95	.04	.08	.48	.30	.27	1.13	.59	.48	1.22
LGO × Asynch.				−.06	.16	−.40				−.71	.62	−1.15
LGO × Synch.				.15	.16	.98				−.18	.74	−.24
Evaluation apprehension										−.92	.37	−2.50*

Note. $N = 153$. Unstandardized coefficients are presented. LGO = learning goal orientation.
[a] The unmonitored condition was coded as the reference group for the categorical moderator variable. Therefore, the main effect for LGO represents the slope for the unmonitored condition (Cohen et al., 2003).
* $p < .05$.

prior research (e.g., Payne et al., 2007) may vary in magnitude, depending on the social and evaluative context of training.

Although past research has shown electronic monitoring of employees can alter performance (Douthitt & Aiello, 2001; Stanton & Sarkar-Barney, 2003), the current study extends this literature in several important respects. This study is the first to test the differences between learners' reactions to archival versus real-time monitoring in the context of web-based instruction. APGO was more strongly related to evaluation apprehension in the archival monitoring condition, whereas PPGO was more strongly related to evaluation apprehension in the real-time monitoring condition. The current findings support the distinction between APGO and PPGO as separate performance orientations because these two variables prompted different types of affective reactions, depending on the characteristics of performance monitoring. Furthermore, these findings support the three-factor conceptualization of goal orientation (DeShon & Gillespie, 2005; VandeWalle, 1997), in that LGO exhibited no relationship with evaluation apprehension in any experimental condition.

Results reveal different patterns of relationships for the two monitoring types, lending credence to the assertion that variation in the way computer monitoring is administered can influence its effects on employees. As such, archival and real-time monitoring should be considered distinct interventions in research and practice related to computer monitoring. This raises concerns about the generalizability of the research literature (which tends to focus on real-time monitoring) for understanding work behavior that is monitored archivally. What we know about employee reactions to real-time monitoring may not accurately describe reactions to archival monitoring. Therefore, future research on employee reactions to EPM should include an asynchronous monitoring condition, or at least make explicit whether or not the EPM under investigation is asynchronous or synchronous.

Implications for Practice

The current findings highlight the adverse consequences of evaluation apprehension in training settings and underscore the need for training design principles or interventions that minimize evaluation concerns during WBT. For applied practice, the current study echoes previous research suggesting that evaluation concerns may hinder performance (e.g., Geen, 1977, 1991). This should cause organizations to carefully consider which aspects of their online training programs (e.g., monitoring features) may heighten evaluation apprehension. A training program that by design provokes evaluation concerns may ultimately counteract learning outcomes differentially across learners, likely resulting in

Table 5
Mean Indirect and Conditional Indirect Effects for APGO on Skill Attainment

Variable	Slope for evaluation apprehension	Indirect effect on skill attainment		
		ab	LL 95% boot CI	UL 95% boot CI
Full sample	.19**	−.15*	−.38	−.02
Unmonitored condition	.04	−.03	−.24	.08
Asynchronous condition	.38*	−.30*	−.70	−.05
Difference with unmonitored	.34**	−.27*	−.72	−.02
Synchronous condition	.20*	−.16*	−.47	−.01
Difference with unmonitored	.17	−.13	−.49	.03

Note. Some error due to rounding. Significance of indirect effect contrasts determined by bootstrapped confidence intervals (see Edwards & Lambert, 2007). Bootstrap sample size = 5,000. APGO = avoid performance goal orientation; LL = lower limit; UL = upper limit; boot CI = bootstrap confidence interval.
* $p < .05$. ** $p < .01$.

Table 6
Mean Indirect and Conditional Indirect Effects for PPGO on Skill Attainment

Variable	Slope for evaluation apprehension	Indirect effect on skill attainment		
		ab	LL 95% boot CI	UL 95% boot CI
Full sample	.15**	−.15*	−.37	−.03
Unmonitored condition	.02	−.02	−.21	.10
Asynchronous condition	.17	−.16*	−.50 (−.44)[a]	.00 (−.02)[a]
Difference with unmonitored	.15	−.14	−.50	.06
Synchronous condition	.30*	−.29*	−.72	−.06
Difference with unmonitored	.28*	−.27*	−.75	−.03

Note. Some error due to rounding. Significance of indirect effect contrasts determined by bootstrapped confidence intervals (see Edwards & Lambert, 2007). Bootstrap sample size = 5,000. PPGO = prove performance goal orientation; LL = lower limit; UL = upper limit; boot CI = bootstrap confidence interval.
[a] 90% bootstrap CI. Although this specific 95% CI contained zero, the 90% CI did not contain zero, supporting the direction hypothesis of a negative indirect effect.
* $p < .05$. ** $p < .01$.

poor transfer of skills to task performance as a result of individual responses to the training environment.

A clear practical implication of the current findings for organizations currently using (or considering using) different kinds of EPM technologies is to recognize that some of their employees may be especially prone to adverse reactions. Importantly, some individuals may show poorer learning outcomes as a result of the distraction associated with monitoring. As such, interventions to minimize evaluation concerns among e-learners are likely to benefit employees and organizations alike. An understanding of the individual differences that influence people's reactions to EPM will better equip organizations to determine who will be most affected by the implementation of EPM and how to mitigate the negative effects of EPM, perhaps by using targeted interventions. These interventions could aim to enhance learners' self-efficacy, which has been shown to moderate the relationship between performance goal orientations and learning (e.g., Dierdorff, Surface, & Brown, 2010; Elliot & Dweck, 1988). For instance, Kozlowski et al. (2001) recommend incorporating opportunities for early successes (or "small wins") to help learners develop confidence in their ability to learn and perform in training. By boosting self-efficacy, high-APGO and high-PPGO learners may experience less evaluation apprehension and less diversion of attentional resources off of the learning task (and onto impression management). Another intervention might include a pretraining orientation in which the training is framed as an opportunity for personal growth and development, emphasizing individual attainment over interpersonal competition or normative comparison (e.g., Stevens & Gist, 1997). Finally, additional information about the purpose of EPM, such as why these procedures are being used and how they will affect decision making, may be provided prior to training to allay employees' concerns about how their individual data will be used. Prior research suggests providing a rationale and explanation of the use of EPM increases employees' perceived fairness and justice of EPM in the workplace, and ultimately job performance and satisfaction (McNall & Roch, 2009).

The current findings add an important caveat to recommendations made elsewhere aimed at inducing certain goal orientations or related motivational constructs (e.g., self-efficacy), in that contextual factors were shown to alter the nature of the relationship between the construct targeted by such interventions and learning outcomes. For example, APGO showed no relationship to evaluation apprehension (and skill attainment) in the unmonitored condition. Therefore, boosting learners' self-efficacy through "small

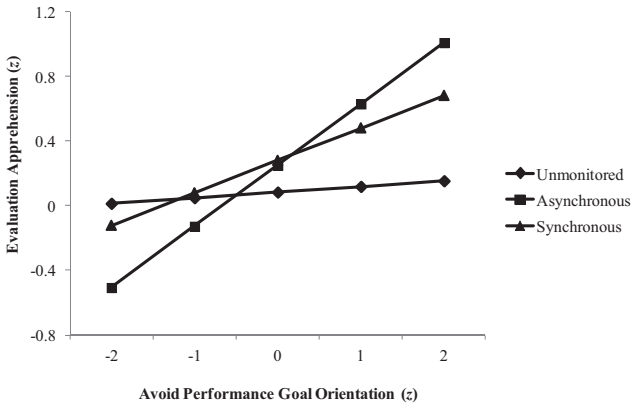

Figure 2. Interaction between avoid performance goal orientation and electronic performance monitoring type predicting evaluation apprehension.

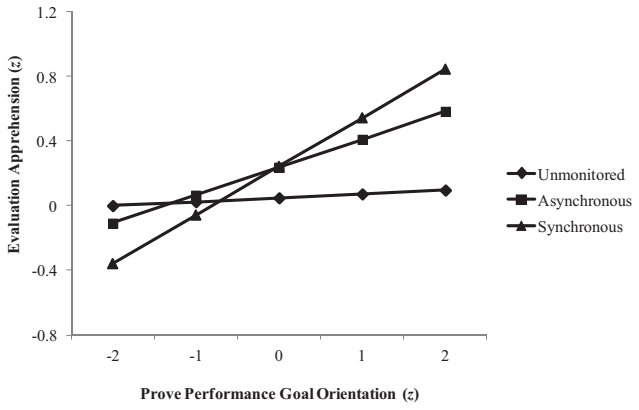

Figure 3. Interaction between prove performance goal orientation and electronic performance monitoring type predicting evaluation apprehension.

wins" in order to mitigate the negative effects of high APGO on evaluation apprehension would rest on the false assumption of an APGO–evaluation apprehension relationship. The current findings suggest such an intervention would be more likely to achieve the intended effect in electronically monitored conditions (in particular, asynchronous monitoring). This research suggests the relevance of a particular situation to a trait represents an important boundary condition (e.g., Tett & Burnett, 2003), such that the effectiveness of interventions aimed at altering a learner's state (e.g., APGO) in order to improve some outcome will depend on the relevance of the situation to the construct.

This study also adds to our understanding of when and why inducing certain goal orientations, through training design and other environmental cues, may prove most beneficial. There is growing evidence that goal orientations can be induced by contextual factors, such as the manner in which training is framed to learners (e.g., Bell & Kozlowski, 2008; Ford, Kraiger, & Merritt, 2010; Kozlowski et al., 2001; Stevens & Gist, 1997; Wallhead & Ntoumanis, 2004). The current findings suggest inducing a goal orientation will produce the strongest impact on leaner behaviors in contexts most trait relevant for the induced orientation. For instance, inducing a low APGO in the unmonitored condition may have resulted in little or no reduction in evaluation apprehension (see Figure 2), but may have produced a notable reduction in evaluation apprehension in the asynchronous monitoring condition. There is a need for research evaluating the utility of inducing goal orientations in learning contexts that vary in trait relevance. It is also unclear the extent to which such environmentally induced goal orientations persist over time, which is relevant to the type of self-directed WBT examined in the current study.

In addition to the actual EPM practices organizations use, organizations should also carefully consider the manner in which EPM practices are communicated to employees. The current findings associated with the EPM manipulation were completely attributable to e-learners' *perceptions* of the presence and characteristics of EPM, as all learners in all conditions were monitored asynchronously using the same software (i.e., Personal Inspector). Therefore, perception is reality in the eyes of employees as it relates to EPM practices. By carefully considering the way in which EPM is implemented, employers may be able to mitigate some of the negative effects of monitoring training activities while still gaining the desired information. Perhaps providing appropriate information about how EPM information will be used could reduce the evaluation apprehension experienced by e-learners (e.g., McNall & Roch, 2009).

In practice, accounting for the influence of individual differences on learning using customized (or adaptive) training design and delivery is costly. Customized or adaptive training may be more costly to implement than standardized training solutions (Dierdorff et al., 2010). However, there is also a "cost" associated with failing to account for individual differences in training design and delivery. This hidden cost is the reduction in learning outcomes and subsequent performance deficits in those employees disadvantaged by standardized training solutions (Dierdorff et al., 2010; Gully & Chen, 2010). Given the substantial resources organizations invest in training, the potential impact of individual differences on the effectiveness of training interventions should receive greater attention than has historically been the case (Gully & Chen, 2010).

Limitations and Future Research

This study has several notable strengths. It tested a proposed model through both manipulated and measured variables, thereby reducing the potential for common method variance and extraneous variables to inflate observed relationships. These methodological characteristics also add confidence to the directionality of the relationships uncovered. Among the variables that were not manipulated, we included both subjective self-report measures and objective measures (i.e., the hands-on skills test). Additionally, the assessments of the self-report measures were separated by time, with goal orientation being assessed before training and evaluation apprehension assessed after training.

A possible limitation of this study is participants were given explicit details regarding the (fictitious) monitoring procedures being used just prior to completing the training task. In practice, employees may not always be aware when monitoring is taking place or the. ture of that monitoring. However, it is common practice for organizations to make monitoring and surveillance procedures explicit to employees. According to the American Management Association's (2007) report on employee monitoring and surveillance, over 80% of organizations that use monitoring have explicit policies informing employees of what activities are being monitored and when monitoring is taking place. The explanation of monitoring policies provided to participants in this study was consistent with that which organizations provide employees in practice.

Furthermore, the goal of this study was to evaluate participants' reactions when they perceive their actions are being monitored in specific ways. Making the monitoring characteristics explicit was needed to ensure participants in each condition perceived similar monitoring practices were taking place. However, it is possible that the salience of electronic monitoring may fade over time, reducing its negative effects on some employees as they acclimate to the presence of monitoring. However, for some employees (e.g., those high in APGO), the cumulative effects of the anxiety associated with monitoring may result in acute physical symptoms, such as fatigue or headaches (e.g., de Croon, Sluiter, Blonk, Broersen, & Frings-Dresen, 2004). The duration of training in this study (i.e., approximately 45 min) was short relative to most academic and industry training programs. The brief training duration is a limitation in that it is unclear how the observed relationships would manifest over the course of longer programs more common in practice. The short training duration did not allow us to evaluate the potential temporal dynamics of reactions to electronic monitoring. Future research is needed to better understand the extent to which the negative effects of performance monitoring diminish (or compound) over time. The current findings may generalize most readily to learners completing relatively short training programs after having read their organization's EPM policy or been exposed to news reports on EPM in the workplace.

Another limitation of this study is the use of a student sample. With the data currently available, we cannot rule out the possibility that different relationships may be observed in an employment setting where it could be in trainees' best interests to strive to achieve high levels of skill attainment. Conversely, if employees perceive training outcomes to be tied to an organizational consequence (e.g., termination, promotion, salary, bonuses), the effects of evaluation apprehension may be exacerbated. However, it

should be noted that although this was a laboratory experiment, the Excel training that participants completed was similar to the type of computer skills courses offered by many employers, and most participants spent a considerable length of time progressing through the content modules. Future research extending the current findings in organizational settings would further increase confidence in the generalizability of these results. The use of a self-report measure of evaluation apprehension as the focal mediator is also a limitation of this study.

Previous research has documented the malleability of state goal orientations to environmental factors (e.g., Ford et al., 2010; Stevens & Gist, 1997). The current findings suggest EPM characteristics may influence the expression of trait performance goal orientation, such that the introduction of monitoring characteristics that are relevant to the performance orientation construct will strengthen the expression of the underlying trait level. However, this study did not directly examine change in state goal orientation due to the presence of specific EPM characteristics. Considering the current findings, it is possible that introducing asynchronous monitoring during WBT may induce a stronger state avoid performance orientation than would have occurred in the absence of monitoring. Similarly, introducing synchronous monitoring may induce PPGO. Future research should examine this issue as it may enhance understanding of goal setting as an intervening mechanism between EPM and learner behaviors during and following training. Elements of the training content should also be considered in future research. It is possible that as training difficulty increases, the anxiety experienced by learners increases as well, exacerbating the effects of monitoring.

Future research should also address precisely why APGO and PPGO differentially predict evaluation apprehension in the real-time and archival conditions, respectively. Why might a trainee with high PPGO be more concerned about the immediate evaluation of an observer and less concerned about delayed evaluations? Is a trainee with high APGO concerned that archived information will be used later to prove incompetence? Follow-up research is needed to pinpoint the mechanisms through which goal orientation influences evaluation apprehension under various performance monitoring conditions.

Conclusion

Organizations will continue to leverage technology to deliver self-directed training solutions and monitor employee participation. It is important to understand the influence these practices have on learners' perceptions, cognitions, and behaviors in the learning context. The current study enhances our understanding of self-regulated learning in monitored web-based settings in several respects. When monitoring is present, the effects of performance goal orientation on state evaluation apprehension appear to be amplified. This amplification was strong enough to show measurable skill deficits in high-performance orientation learners under certain monitoring conditions. High-APGO learners reacted most negatively to asynchronous monitoring, whereas high-PPGO learners reacted most negatively to synchronous monitoring.

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